

TREASURY DEPARTMENT
UNITED STATES COAST AND GEODETIC SURVEY
W. W. DUFFIELD
SUPERINTENDENT.

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UNITED STATES COAST PILOT

ATLANTIC COAST

PART VIII

Gulf of Mexico, from Key West to the Rio Grande.

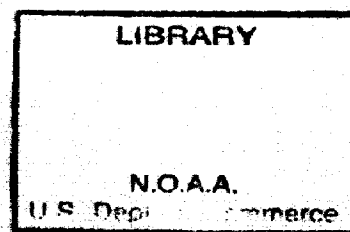
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TREASURY DEPARTMENT.
UNITED STATES COAST AND GEODETIC SURVEY OFFICE,
WASHINGTON, D. C., *December 15, 1896.*

This volume covers the coast from Key West to the Rio Grande, including the harbors and navigable inland passages. It has been prepared as a part of a large volume designed to embrace the Atlantic coast of the United States.

This publication is based mainly upon the work of the Coast and Geodetic Survey, including the results of special examinations and investigations carried on in connection with its preparation.

The system adopted in this publication includes—

I. A tabular description of all lighthouses, light-vessels, and fog signals; lists of life-saving stations, Weather Bureau wind signal display stations; and information regarding tides, tidal currents, variation of the compass, etc.

II. General information concerning the several bodies of water and harbors, including notes relative to pilots and pilotage, towboats, depth of water, draft of vessels entering, harbor and quarantine regulations, supplies, facilities for making repairs, usual or best anchorages, and other matters of practical interest. In each case the information of this nature precedes the sailing directions and is printed in smaller type.

III. Sailing directions, with subordinate paragraphs treating of prominent objects, dangers, aids to navigation, etc. In the arrangement adopted the aim has been to conform, as far as practicable, to the order in which these matters would be considered in practice, and to render available such information as may be wanted promptly. For this purpose, and to afford a ready means of reference from one part to another, the sailing directions, where long, are divided into numbered or lettered sections, printed in large type, each followed by its own subordinate remarks in smaller type.

IV. Appendices.

This volume has been prepared by Lieut. Glennie Tarbox, U. S. N., and Mr. John Ross, the work being under the general direction of Lieut. Commander H. G. O. Colby, U. S. N., Hydrographic Inspector Coast and Geodetic Survey.

Great courtesy has been shown by local authorities in furnishing information desired for incorporation in this work.

The aids to navigation are correct to January 1, 1897.

As absolute accuracy in a work of this class is scarcely possible, navigators will confer a favor by notifying the Superintendent of the Coast and Geodetic Survey of errors which they may discover, or of additional matter which they think, for the good of mariners, should be inserted.

W. W. DUFFIELD,
Superintendent.

NOTE.

All bearings and courses are *magnetic*.

All distances are in *nautical miles*, except where otherwise stated.

Except where otherwise stated, all depths are at *mean low water*.

SYSTEM OF BUOYAGE ADOPTED IN UNITED STATES WATERS.

The following order is observed in coloring and numbering the buoys in United States waters, viz:

1. In approaching the channel, etc., from seaward, RED BUOYS, with EVEN NUMBERS, will be found on the STARBOARD side of the channel, and must be left on the STARBOARD hand in passing in.

2. In approaching the channel, etc., from seaward, BLACK BUOYS, with ODD NUMBERS, will be found on the PORT side of the channel, and must be left on the PORT hand in passing in.

3. BUOYS painted with RED and BLACK HORIZONTAL STRIPES will be found on OBSTRUCTIONS, with channel ways on either side of them, and may be left on either hand in passing in.

4. BUOYS painted with WHITE and BLACK PERPENDICULAR STRIPES will be found in MID-CHANNEL and must be passed close-to to avoid danger.

All other distinguishing marks to buoys will be in addition to the foregoing, and may be employed to mark particular spots, *a description of which will be given in the printed list of buoys.*

Perches, with balls, cages, etc., will, when placed on buoys, be at turning points, the color and number indicating on what side they shall be passed.

Nun buoys, properly colored and numbered, are usually placed on the starboard side, and can buoys on the port side of channels.

Day beacons, stakes, and spindles (except such as are on the sides of channels, which will be colored like buoys) are constructed and distinguished with special reference to each locality, and particularly in regard to the background upon which they are projected.

The positions of the buoys mentioned in this volume are shown on the charts of the United States Coast and Geodetic Survey, which are kept corrected from information furnished by the Inspectors of the Lighthouse Districts, for the changes in the aids to navigation rendered necessary from time to time to indicate the best channels.

The following symbols and abbreviations are used on the charts of the Coast and Geodetic Survey:

◇ Red buoys, with even numbers, to be left on starboard hand in entering; if green, yellow, or white, the color is printed close to the buoy.

◆ Black buoys, with odd numbers, to be left on the port hand in entering.

◇ Black and white perpendicular stripes, without numbers, mid-channel or fairway buoys.

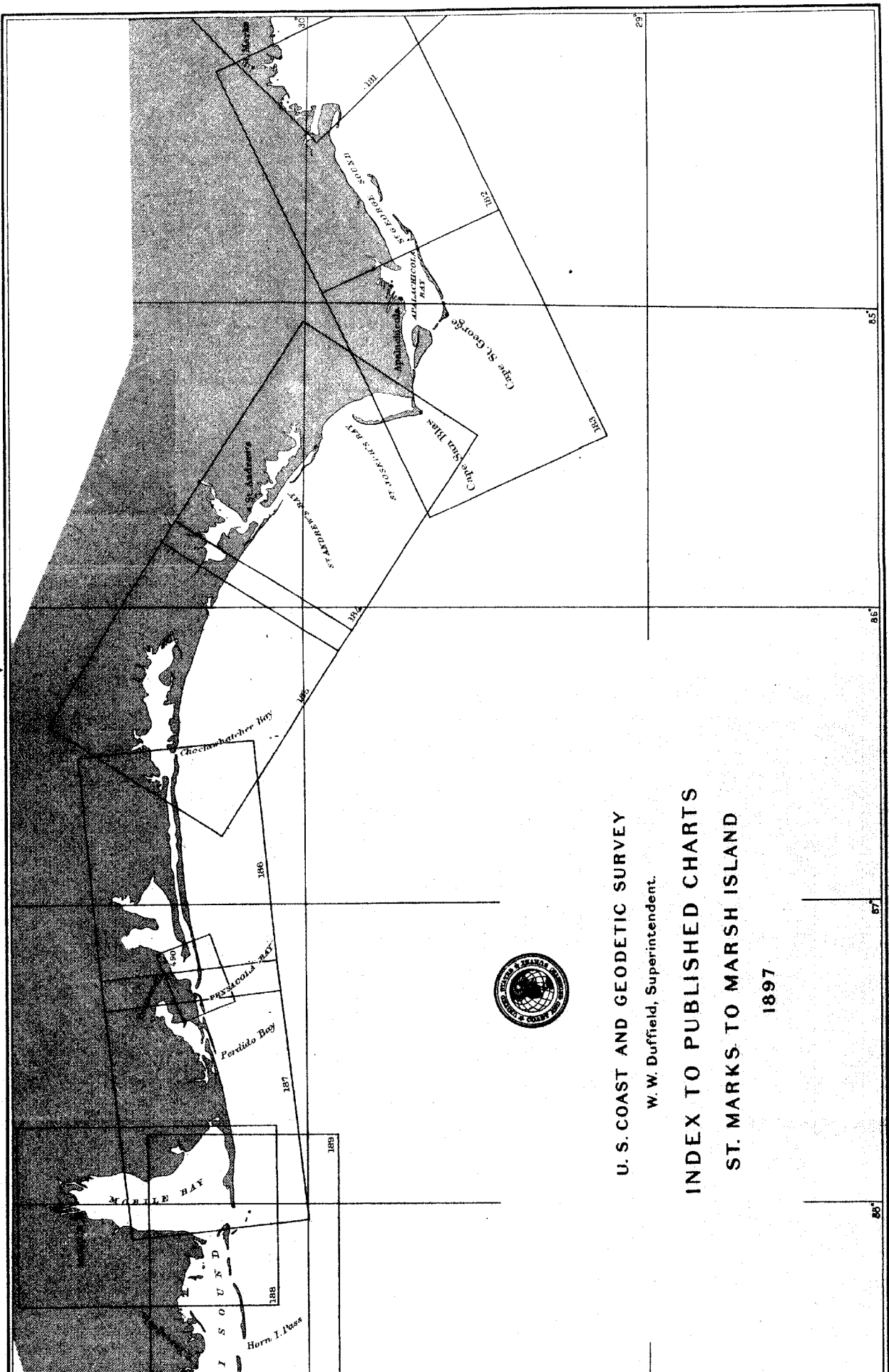
◇ or H. S., red and black horizontal stripes, without numbers, marking dangers or obstructions, to be left on either hand.

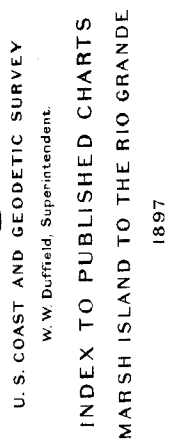
◇ Lighted buoys, different colors as above.

◇ **WHISTLE**, whistling buoys, different colors as above.

◇ **BELL**, bell buoys, different colors as above.

C., N., or S., signifies can, nun, or spar buoy.





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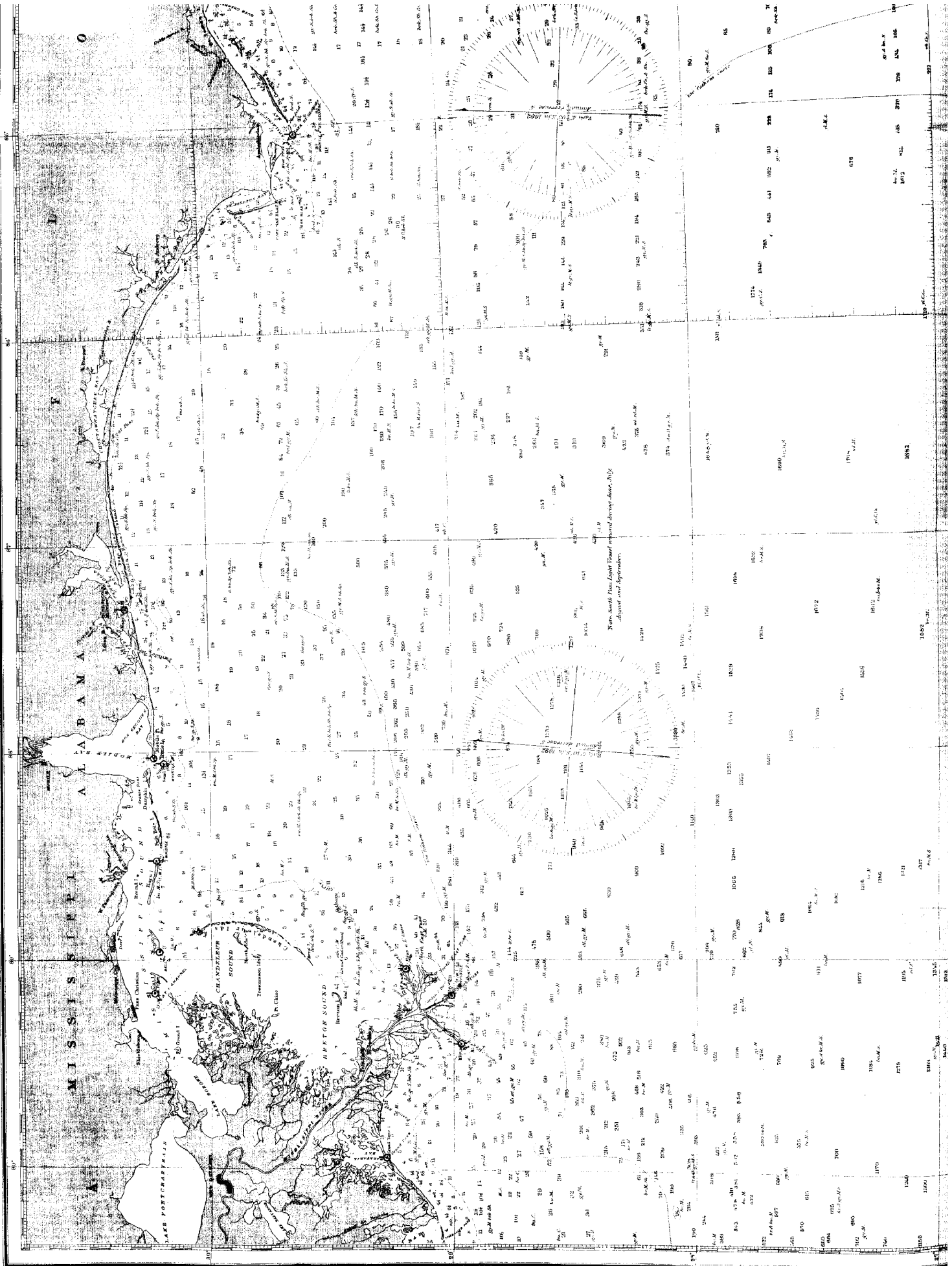
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GULF COAST OF THE UNITED STATES

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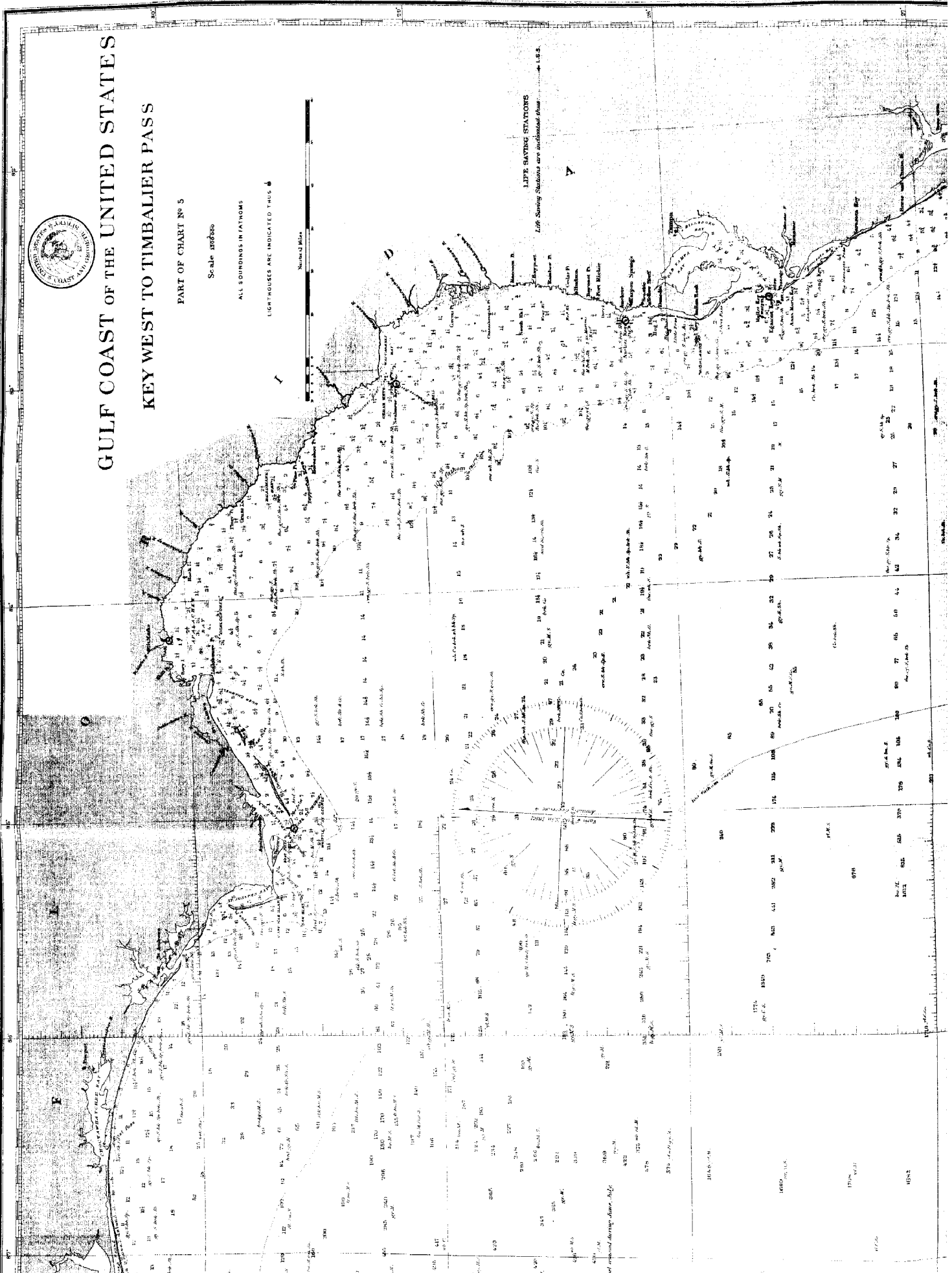
ALL SOUNDINGS IN FATHOMS

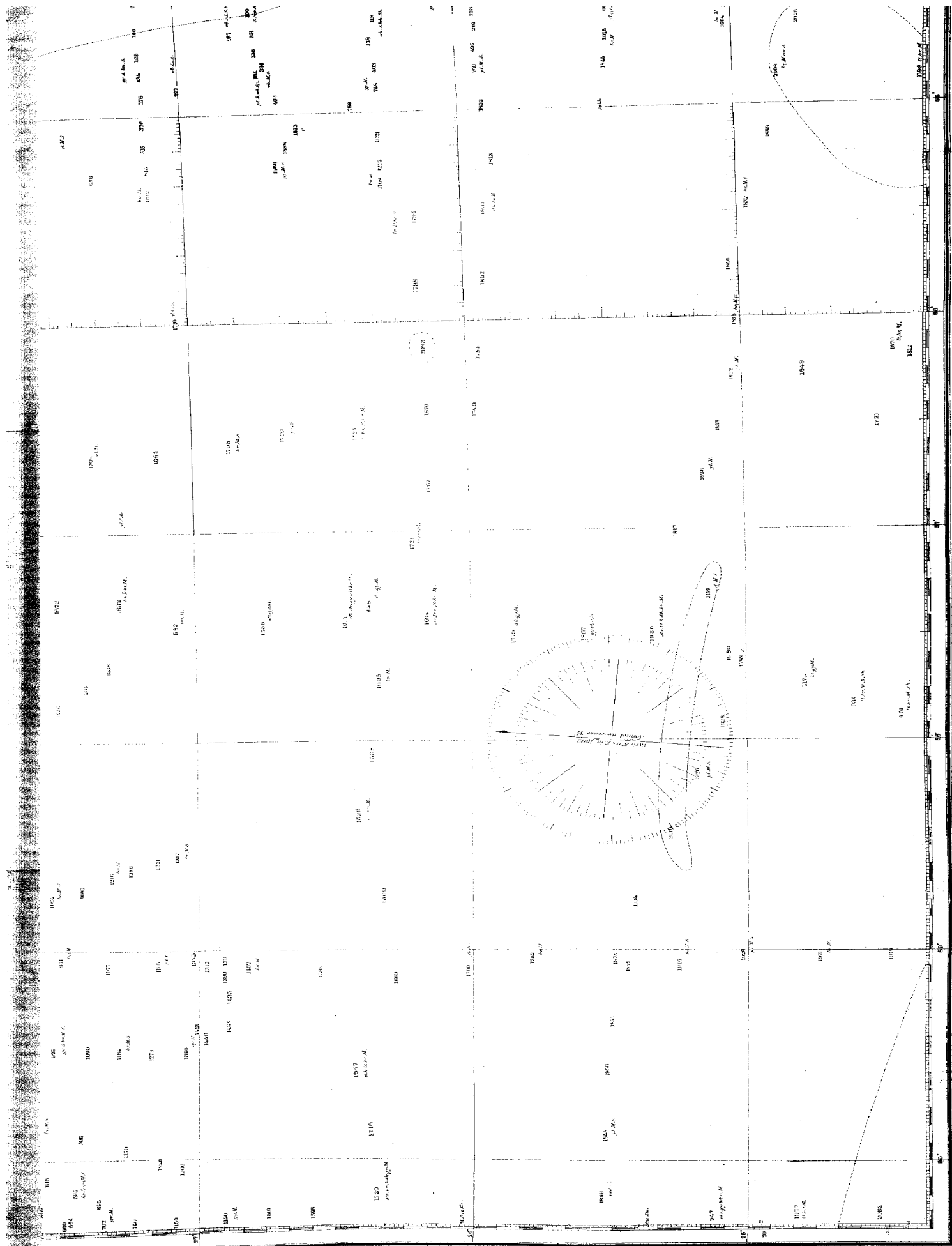
LIGHTHOUSES ARE INDICATED THUS

Nautical Miles

LIFE SAVING STATIONS

Life Saving Stations are indicated thus







UNITED STATES COAST PILOT.

ATLANTIC COAST—PART VIII

GULF OF MEXICO, FROM KEY WEST TO THE RIO GRANDE.*

GENERAL REMARKS.

This volume, Part VIII, of the "United States Coast Pilot, Atlantic Coast," covers the coast of the United States bordering on the Gulf of Mexico between Key West, Fla., and the Rio Grande. That portion of the coast of the United States between Chesapeake Bay entrance and Key West is covered by "United States Coast Pilot, Atlantic Coast, Part VII."

Within the limits covered by this volume (Part VIII), the coast, which has an approximate length of 1,500 miles, is low and generally sandy, and presents no marked natural features to the mariner approaching it from seaward. The principal points and harbor entrances are marked by lighthouses and these are the chief guides for approaching or standing along the coast. The harbors are all obstructed by bars at their entrances, which, in a heavy sea, prevent the deeper draft vessels from entering.

The principal harbors are Dry Tortugas, Charlotte Harbor, Tampa Bay, Apalachicola (East Pass), St. Josephs Bay, Pensacola, Mobile, Pascagoula, Ship Island, South Pass (New Orleans), Sabine Pass, Galveston, and Brazos River. These, with the harbors and anchorages of lesser importance, are described under their respective headings.

Pilots.—For all the principal harbors and many of those of lesser importance pilots are appointed by the state and local authorities. Pilots will usually be found cruising off the entrances or just outside the bars of the harbors, or, they will come out to a vessel making signal for one. Pilot laws and rates for pilotage are given in Appendix I.

Towboats.—At nearly all of the principal harbors towboats can be had outside of the bar by making signal (see "Towboats" under the headings of the different harbors).

Quarantine.—There are National Quarantine stations at Dry Tortugas and at Ship Island. All the ports have local quarantine stations which are controlled by the state and local boards of health (see quarantine laws, Appendix I, and National Quarantines, Appendix IV).

U. S. Marine Hospital Service regulations are given in Appendix IV. See also the "General remarks for approaching and sailing along the coast of the United States in the Gulf of Mexico" in another part of this volume.

* Shown on the following Coast and Geodetic Survey charts, D, 5, Sailing Charts, scale respectively $\frac{1}{2,100,000}$ and $\frac{1}{1,200,000}$, price of each \$0.50; 16, 17, 18, 19, 20, 21, General Charts of the coast, scale $\frac{1}{400,000}$, price of each \$0.50; 167 to 212, both inclusive, scale $\frac{1}{80,000}$, price of each \$0.50; and a number of harbor charts, on a larger scale, as noted under the several headings; all charts referred to in footnotes are issued by the Coast and Geodetic Survey.

Coast and Geodetic Survey charts can be obtained from the agents named in the list given on pages 7 and 8. Facing page 8 are index maps, showing the location and limits of charts covering that part of the coast included in this volume. The catalogue of charts and other publications of the Survey also contain similar index maps; copies of this catalogue can be obtained free of charge on personal application at any of the sale agencies or by letter addressed to the Coast and Geodetic Survey Office, Washington, D. C.

SAND KEY TO POINT ISABEL.

TABLE OF LIGHTS.

Lighthouse Districts, Etc.—The coast and the waters covered by this volume lie within the Seventh and Eighth Lighthouse Districts of the United States. These districts extend from Jupiter Inlet, Florida, including the inland water ways (except the Mississippi River and its tributaries above New Orleans) and coast to the Rio Grande, Texas. The Light list for the seacoasts of the United States and the Buoy lists for the Seventh and Eighth Districts give full descriptions of the aids to navigation.

Number.	Name.	Latitude, north. Longitude, west.	Characteristics of light.	Order of light.	Height of light above sea level, in feet.	Distance visible, in nautical miles.
1	SAND KEY	24 27 10 81 52 40	Fixed white for 1 minute, varied in next minute by a white flash of 10 seconds' duration, preceded and followed by partial eclipses of 25 seconds from S. by W. $\frac{3}{8}$ W. to SW. $\frac{1}{4}$ W.; from W. $\frac{3}{4}$ S. through southward to ENE. $\frac{1}{4}$ E.; from E. $\frac{7}{8}$ N. to SE. by E. $\frac{7}{8}$ E., and from SE. $\frac{5}{8}$ E. to S. $\frac{1}{2}$ W.; fixed red for 1 minute, varied in the next minute by a red flash of 10 seconds' duration, preceded and followed by partial eclipses of 25 seconds throughout the intervening sectors.	1	109	16 $\frac{1}{4}$
2	KEY WEST	24 32 58 81 48 04	Fixed white, from N. $\frac{1}{4}$ W. through southward to NE. $\frac{5}{8}$ E.; from NE. by E. $\frac{1}{2}$ E. through westward to SE. $\frac{9}{8}$ E., and from SE. $\frac{1}{4}$ S. through the northward and eastward to NW. $\frac{1}{4}$ N.; fixed red throughout the intervening sectors.	3	90 $\frac{1}{2}$	15 $\frac{1}{4}$
3	North west Passage	24 37 (04) 81 53 (58)	Fixed white, from S. by W. $\frac{3}{8}$ W. through northeastward to NW. $\frac{1}{4}$ W., and from NNW. $\frac{1}{4}$ W. through southward and westward to S. by W.; fixed red throughout the intervening sectors.	4	47	12 $\frac{1}{4}$
4	Rebecca Shoal	24 35 (03) 82 35 (07)	Flashing alternately red and white, excepting from WSW. $\frac{1}{4}$ W. southward to NW. by W. $\frac{1}{4}$ W. in which sector every flash is red; interval between flashes, 5 seconds.	4	66	13 $\frac{3}{4}$
5	DRY TORTUGAS	24 38 04 82 55 42	Fixed white, with a fixed red sector from NE. by N. northward to ENE. $\frac{1}{2}$ E.	1	149 $\frac{1}{2}$	18 $\frac{1}{4}$
6	Tortugas Harbor	24 37 (46) 82 52 (50)	Fixed white from SW. to SW. $\frac{3}{4}$ W.; from W. $\frac{1}{4}$ N. through southward to NE. by E. $\frac{1}{4}$ E.; and from E. $\frac{3}{4}$ N. through northward to S.; fixed red throughout the intervening sectors.	4	67	13 $\frac{3}{4}$
7	SANIBEL ISLAND	26 27 11 82 00 13	Fixed white, varied by a white flash every 2 minutes.	3	98	15 $\frac{1}{4}$
8	Gasparilla Island (front)	26 42 (50) 82 15 (46)	Fixed white.	Tubular lantern.	20	
9	Gasparilla Island (rear)	26 43 (04) 82 15 (40)	Fixed white, varied by a red flash every 20 seconds.	3 $\frac{1}{2}$	41	11 $\frac{1}{4}$
10	Charlotte Harbor	26 45 (35) 82 06 (40)	Fixed red.	5	36	8 $\frac{1}{2}$
11	Mangrove Point Beacon	26 53 (56) 82 07 (26)	Fixed white.	Tubular lantern.	9 $\frac{1}{2}$	
12	Peace Creek Beacon	26 55 (49) 82 06 (17)	Fixed red.	Tubular lantern.	9 $\frac{1}{2}$	
13	EGMONT KEY	27 46 04 82 45 40	Fixed white, with a narrow fixed red sector between N. 24° 30' E. (NNE. $\frac{1}{8}$ E.) and N. 26° E. (NNE. $\frac{1}{4}$ E.) and another narrow fixed red sector between S. 84° 30' E. (E. $\frac{1}{2}$ S.) and S. 83° E. (E. $\frac{3}{8}$ S.).	3	84 $\frac{1}{4}$	14 $\frac{1}{4}$
14	Snead Point Shoal Beacon	27 32 (10) 82 39 (55)	Fixed white.	Lens lantern.	29 $\frac{1}{2}$	
15	Manatee River Cut Beacon	27 31 (48) 82 39 (17)	Fixed red.	Lens lantern.	30 $\frac{1}{4}$	
16	Mullet Key Shoal	27 37 (46) 82 40 (58)	Fixed white.	Lens lantern.	38	
17	Indian Hill	27 41 (45) 82 32 (39)	Fixed red.	Lens lantern.	38	
18	South Cut	27 47 (49) 82 34 (15)	Fixed red.	Lens lantern.	38	
19	North Cut	27 50 (02) 82 33 (52)	Fixed red.	Lens lantern.	38	
20	Long Shoal	27 52 (45) 82 27 (34)	Fixed white.	Lens lantern.	38	
21	Middle Ground	27 54 (27) 82 28 (19)	Fixed red.	Lens lantern.	38	
22	Barrel Stake	27 55 (16) 82 28 (22)	Fixed white.	Lens lantern.	38	

KEY WEST TO THE RIO GRANDE.

These pamphlets, which are corrected and reprinted from time to time, are sent free of charge to any shipmaster on application to the office of the Lighthouse Board, Washington, D. C., or to the Inspector of the Seventh Lighthouse District, Navy Yard, Pensacola, Fla., and Inspector of the Eighth Lighthouse District, New Orleans, La. They can also be had on application at the United States Branch Hydrographic Office at New Orleans, La.

Number.	Color and peculiarity of lighthouse or vessel.	Height, in feet, from base of structure to center of lantern.	Fog signal.
1	Brown pyramidal framework, on pile foundation, inclosing square dwelling and cylindrical stairway to black lantern.		
2	White tower and black lantern; detached white dwelling, with green blinds	80	
3	White screw-pile structure; piles, red; lantern, black		
4	Square $1\frac{1}{2}$ -story dwelling, surmounted by lantern, on iron pile foundation. Foundation, brown; dwelling, white, with green blinds; lantern, black.		
5	Conical tower; lower half, white; upper half, lantern, and dome, black. Oil room near tower; dwelling a short distance to southward; both of yellow brick.	150	
6	Brown, hexagonal tower; lantern, black	25	
7	Brown, skeleton tower and lantern. Two white dwellings near tower	96	
8	Square, black, pyramidal, skeleton structure		
9	White, one-story frame dwelling, with green blinds and shingled roof, surmounted by a black lantern; brown pile foundation. A similar structure, without the lantern, stands about 70 feet N.E. by E.		
10	Square, white, $1\frac{1}{2}$ -story structure, with green blinds and red roof, surmounted by a black lantern and resting on brown screw-pile foundation.		
11	Square, black, pyramidal skeleton structure		
12	Square, red, pyramidal skeleton structure		
13	White tower; lantern, black; white dwelling detached, green blinds	81	Anderson fog horn sounded in answer to signals from passing vessels.
14	Square, black, pyramidal structure, covered with horizontal slats, on four piles		
15	Square, red, pyramidal structure, covered with horizontal slats, on four piles		
16	Column, from which lantern is suspended, on a triangular platform on three iron-cased piles, entire structure black.		
17	Column, from which lantern is suspended, on a triangular platform on three iron-cased piles, entire structure red.		
18	Column, from which lantern is suspended, on a triangular platform on three iron-cased piles, entire structure red.		
19	Column, from which lantern is suspended, on a triangular platform on three iron-cased piles, entire structure red.		
20	Column, from which lantern is suspended, on a triangular platform on three iron-cased piles, entire structure black.		
21	Column, from which lantern is suspended, on a triangular platform on three iron-cased piles, entire structure red.		
22	Column, from which lantern is suspended, on a triangular platform on three iron-cased piles, entire structure black.		

SAND KEY TO POINT ISABEL.

TABLE OF LIGHTS—Continued.

Number.	Name.	Latitude, north. Longitude, west.	Characteristics of light.	Order of light.	Height of light above sea level, in feet.	Distance visible, in nautical miles.
23	ANCLOTE KEYS.....	28 10 (02) 82 50 (44)	Flashing red every 30 seconds.....	3.	101	15 $\frac{3}{4}$
24	Cedar Keys.....	29 05 49 83 03 58	Fixed white, varied by a white flash every minute.	4	74 $\frac{1}{2}$	14 $\frac{1}{4}$
25	Turning Point Beacon.....	29 06 (13) 83 03 (26)	Fixed red.....	Lantern.	31	
26	ST. MARKS.....	30 04 28 84 10 50	Fixed white.....	4	82	14 $\frac{3}{4}$
27	Range. Carrabelle River Bar (front) Beacon.....	29 49 (59) 84 39 (32)	Fixed white.....	Lantern.	14 $\frac{3}{4}$	
28		29 50 (09) 84 39 (24)	Fixed red.....	Lantern.	21	
29	Timber Island Beacon.....	29 50 (24) 84 39 (56)	Fixed white.....	Lantern.	17	
30	Range. Crooked River (front).....		Fixed white.....	Lens lantern.	48	
31		29 49 (42) 84 42 (05)	Flashing white; group of 2 flashes every 10 seconds; interval between flashes in group, 2 $\frac{1}{2}$ seconds.	4	115	16 $\frac{1}{2}$
32	Six-foot Spot Beacon.....	29 43 (10) 84 48 (22)	Fixed white.....	Lens lantern.	29	
33	Porter Bar Beacon.....	29 41 (53) 84 49 (18)	Fixed red.....	Lens lantern.	29	
34	Range. Bulkhead Cut Range Beacon (front).....	29 42 (46) 84 54 (07)	Fixed white.....	Lens lantern.	28	
35			Fixed red.....	Lens lantern.	28	
36	CAPE ST. GEORGE.....	29 35 18 85 02 52	Fixed white.....	3	72	14
37	Range. Apalachicola Bay (front).....	29 42 (35) 84 58 (40)	Fixed red.....	Tubular lantern.	15	
38		29 44 (05) 84 58 (59)	Fixed red.....	Tubular lantern.	17	
39	CAPE SAN BLAS.....		Fixed white.....	Lens lantern.	45	
40	Range. PENSACOLA.....	30 20 47 87 18 32	Flashing white every minute.....	1	190 $\frac{3}{4}$	20
41		30 20 (42) 87 18 (30)	Fixed white.....	6	55	11 $\frac{1}{4}$
42	Range. Fort McRee (front).....	30 19 11 87 19 11	Fixed white.....	Tubular lantern.	36	
43		30 19 14 87 19 18	Fixed red.....	Tubular lantern.	49	
44	Range. Fort Barrancas (front).....	30 20 45 87 18 06	Fixed white.....	Tubular lantern.	36	
45		30 20 49 87 18 07	Fixed red.....	Tubular lantern.	75	
46	Devils Point.....	30 29 23 87 08 28	Fixed red.....	Lens lantern.	30	
47	White Point.....	30 21 (00) 87 02 (41)	Fixed red.....	Lens lantern.	30	
48	Escribano Point.....	30 31 (07) 87 01 (46)	Fixed red.....	Lens lantern.	30	
49	Range. SAND ISLAND (front).....	30 11 19 88 03 02	Fixed white.....	2	131	17 $\frac{1}{4}$
50			Fixed white.....	Ref'r	35	11
51	Mobile Point Beacon.....	30 13 37 88 01 29	Fixed white.....	Tubular lantern.	35	
52	MOBILE POINT.....	30 13 44 88 01 26	Fixed red.....	4	49	11 $\frac{1}{4}$

The numerous lighted beacons along the dredged cut to Mobile Bay have been omitted on account of frequent and numerous changes.

KEY WEST WEST TO THE RIO GRANDE—Continued.

Number.	Color and peculiarity of lighthouse or vessel.	Height, in feet, from base of structure to center of lantern.	Fog signal.
23	Brown skeleton tower and black lantern. Two white dwellings, with green blinds, in rear of tower.	96	
24	Lantern on white dwelling	18	
25	Square, pyramid of horizontal slats, on four piles, painted red		
26	White tower and dwelling attached; balustrade, lantern, dome, and cowl, black	75	
27	White platform on a cluster of six black piles		
28	Red platform on a cluster of six black piles		
29	White platform on a cluster of six black piles		
30	Lantern suspended from top of a white iron column, with small white lamp house at its base.		
31	Square, dark red, pyramidal, skeleton, iron tower: lantern, black. Square, white, frame dwelling, with green blinds, to the northeastward and another to the southwestward of the tower.	96½	
32	Square pyramid of horizontal slats, painted black		
33	Square pyramid of horizontal slats, painted red		
34	Square pyramid of horizontal slats, painted black		
35	Square pyramid of horizontal slats, painted red		
36	White tower; lantern, dome, and cowl, black; white dwelling. White dwelling 240 feet E. of the lighthouse.	68	
37	Lantern on a single pile. Temporary structure		
38	Lantern on cluster of three white iron-cased piles		
39	A temporary light near site of old lighthouse, which is being removed. A new lighthouse is being erected on Black's Island, in St. Joseph's Bay.		
40	Conical brick tower, lower third, white; upper two-thirds and lantern, dome, and cowl, black.	160	
41	Front of beacon, white; sides, black	26¼	
42	Square, white, pyramidal framework	30	
43	Square, red, pyramidal framework		
44	Square, white, pyramidal framework	30	
45	Square, red, pyramidal framework	50	
46	Square, red, pyramidal framework		
47	Square, red, pyramidal framework		
48	Square, red, pyramidal framework		
49	Black, conical tower; white dwelling with green blinds, on brick foundation, 768 feet N. by W. ¾ W. from tower. Square pyramidal fog-bell tower near Rear light on the middle of the ridge of the roof of the keeper's dwelling.	125	Bell struck by machinery every 20 seconds.
50			
51	Square, red, pyramidal framework		
52	Pyramidal, brown skeleton tower, upper part inclosed. White dwelling outside of fort.	30	

SAND KEY TO POINT ISABEL.

TABLE OF LIGHTS—Continued.

Number.	Name.	Latitude, north, Longitude, west.	Characteristics of light.	Order of light.	Height of light above sea level, in feet.	Distance visible in nauti- cal miles.
53	Lower Channel Beacon, No. 51	0 1 11	Fixed white.	Lantern.	8	
54	Mobile Bay	30 26 (22) 88 00 (43)	Fixed white, varied by a red flash every 30 seconds.	4	41	11 $\frac{3}{4}$
55	Dog River Bar Beacon, No. 1		Fixed white.	Tubular lantern.	20	
56	Choctaw Pass Channel (rear), Beacon No. 3		Fixed white.	Tubular lantern.		
57	Dog River Bar and Choctaw Pass Channel ranges (front for both), Beacon No. 2.		Fixed white.	Tubular lantern.	20	
58	Battery Gladden (also Dog River Bar Range, rear).	30 40 (05) 88 00 (16)	Fixed white, with a fixed red sector between NE. by E. $\frac{3}{4}$ E. and ENE. $\frac{1}{2}$ E.	4	45 $\frac{1}{2}$	12 $\frac{1}{4}$
59	Horn Island	30 13 (13) 88 31 (45)	Fixed white, varied by a red flash every minute.	4	43	11 $\frac{3}{4}$
60	Round Island	30 17 29 88 35 07	Fixed white.	4	50	12 $\frac{1}{2}$
61	Pascagoula River (front)	30 20 (39) 88 34 (06)	Fixed white.	Tubular lantern.	22	
62	Pascagoula River (rear)	30 29 (47) 88 34 (13)	Fixed red.	Tubular lantern.	28	
63	East Pascagoula River	30 21 01 88 34 06	Fixed white.	5	36 $\frac{1}{2}$	11 $\frac{1}{4}$
64	Ship Island	30 12 (53) 88 57 (56)	Fixed red.	4	73	11 $\frac{1}{4}$
65	Biloxi	30 23 44 88 54 04	Fixed white.	5	60 $\frac{1}{2}$	13
66	Cat Island	30 13 (56) 89 09 (41)	Fixed white, varied by a white flash every 90 seconds.	5	45 $\frac{1}{2}$	12
67	Merrill Shell Bank	30 14 (17) 89 15 (28)	Fixed white.	4	42	11 $\frac{3}{4}$
68	Lake Borgne	30 10 (35) 89 27 (33)	Fixed white.	5	43 $\frac{1}{2}$	11 $\frac{3}{4}$
69	West Rigolets	30 10 33 89 44 34	Fixed white.	5	29	10 $\frac{1}{2}$
70	Pointe aux Herbes	30 09 (29) 89 51 (20)	Fixed red.	5	37 $\frac{1}{2}$	8 $\frac{1}{2}$
71	Port Pontchartrain	30 01 59 90 03 43	Fixed white, varied by a white flash every 90 seconds.	5	47	11 $\frac{3}{4}$
72	Bayou St. John	30 01 (50) 90 04 (57)	Fixed red.	6	33	7 $\frac{1}{2}$
73	New Canal	30 01 (41) 90 06 (47)	Fixed white.	5	47 $\frac{1}{2}$	12 $\frac{1}{4}$
74	Chefuncte River	30 22 (58) 90 05 (59)	Fixed white.	5	49	12 $\frac{1}{4}$
75	Pass Manchac	30 17 (48) 90 12 (39)	Fixed white.	5	31	10 $\frac{1}{4}$
76	Amite River		Fixed white.	Tubular lantern.	45	
77	ORANDELEUR	30 02 (58) 88 52 (19)	Fixed white.	3	99	15 $\frac{1}{4}$
78	PASS A LOUÏE	29 11 30 89 03 28	Fixed white, varied by a white flash every 45 seconds.	3	63	13 $\frac{1}{4}$
79	South Pass Light-Vessel, No. 43	28 59 (09) 89 06 (47)	Fixed white.	Red'r	40	11 $\frac{1}{2}$
80	South Pass East Jetty	28 59 (28) 89 08 (08)	Fixed red.	5	52	8 $\frac{1}{4}$
81	South Pass West Jetty		Fixed white.	5	26	40 $\frac{1}{4}$

KEY WEST TO THE RIO GRANDE—Continued.

Number.	Color and peculiarity of lighthouse or vessel.	Height, in feet, from base of structure to center of lantern.	Fog signal.
53	Open-frame pile beacon, surmounted by a pyramid 30 feet high, painted red. Lantern below pyramid.		
54	Hexagonal screw-pile structure, with pyramidal roof, surmounted by black lantern; piles, red; dwelling, white, with green blinds.		Bell struck by machinery every 5 seconds.
55	Red open-frame pile beacon, surmounted by a pyramid, with lantern attached.		
56	Red open-frame pile beacon, surmounted by a pyramid, with lantern attached.		
57	Red open-frame pile beacon, surmounted by a pyramid, with lantern attached.		
58	Square screw-pile structure; piles, red; dwelling, white.	41	
59	Black lantern on square 1½-story frame dwelling. Dwelling, white, with lead-colored trimmings and green blinds.	28	
60	Conical white tower; lantern, black; white dwelling near.	45	
61	Black, triangular, pyramidal framework.		
62	Black, triangular, pyramidal framework.		
63	Lantern on white dwelling.	35	
64	Black lantern on square, white, pyramidal tower. One-story, white frame dwelling, with green blinds alongside.	50	
65	Conical, white tower, dwelling near.	48	
66	Square, white screw-pile structure; piles and lantern red.	40	
67	Square, white screw-pile structure with pyramidal roof; lantern, black.	51	Bell struck by machinery every 20 seconds.
68	Square tower rising from roof of square, white dwelling on brown pile foundation; roof, brown; lantern, black.		Bell struck by machinery every 30 seconds.
69	Black lantern on square, white dwelling with pyramidal roof.		
70	Black lantern on square, white dwelling, standing on five white piers.	38	
71	Conical, white tower; lantern, black; white dwelling, detached.	36	
72	Lantern on a white, cylindrical column, with small white building at base, supported on platform on piles.	28	
73	Square, white, two-story frame dwelling, surmounted by black lantern and resting on pile foundation.	28	
74	Conical, white tower; lantern, black; one-story, white framed dwelling, with pyramidal roof, detached. White, pyramidal fog-bell tower between tower and dwelling.	43	Bell struck by machinery every 30 seconds.
75	Cylindrical, white brick tower attached to white brick dwelling.	30	
76	One-story, white frame dwelling, on four brown, wooden piles; blinds, green.		
77	Square, pyramidal iron skeleton structure, brown from its base to the gallery, and black above. Two square, white dwellings, on piles, about 30 feet from tower.		
78	Conical, black tower, white dwelling 30 feet to southward. Black day beacon of open framework, surmounted by a ball, bears E. $\frac{3}{4}$ S. from tower.	70	
79	Two masts, schooner-rigged, no bowsprit, red, elliptical iron cagework day mark at each masthead. Hull red, with "South Pass" in large, white letters on each side and "No. 43" in white on the stern. A black smokestack and the fog signal are between the masts.		12-inch steam whistle; blasts 4 seconds, silent intervals 56 seconds.
80	White, square, pyramidal tower with green blinds, surmounted by black lantern and a flagstaff with gilt ball 23 feet above the lantern; a fog-signal house, painted like the tower, stands alongside. Tower and fog-signal house on brown pile foundation.		Bell struck by machinery every 10 seconds.
81	Black, four-sided, pyramidal structure, on wooden pile foundation.	15	

SAND KEY TO POINT ISABEL.

TABLE OF LIGHTS—Continued.

Number.	Name.	Latitude, north. Longitude, west.	Characteristics of light.	Order of light.	Height of light above sea level, in feet.	Distance visible, in nauti- cal miles.
82	Range, { South Pass Beacon (front) -----	29 00 (59) 89 10 (01)	Fixed white -----	Ref'r	17	
83	{ SOUTH PASS (rear) -----	28 58 22 89 23 30	Flashing white every 5 seconds -----	1	108	16 1/4
84	SOUTHWEST PASS -----	28 58 22 89 23 30	Fixed white -----	1	123 1/2	16
85	Head of Passes -----	29 08 34 89 15 05	Fixed white -----	5	38	11 1/4
86	Head of Passes West Jetty -----	29 08 (47) 89 15 (08)	Fixed white -----	Lens lantern.	25	
87	Head of Passes East Jetty -----		Fixed red -----	Tubular lantern.	25	
88	Cubits Gap Post Light -----	29 11 (32) 89 15 (49)	Fixed red -----	Tubular lantern.	35	
89	The Jump Post Light -----		Fixed white -----	Lantern.	35	
90	St. Philips Bend Post Light -----	29 21 (58) 89 27 (30)	Fixed red -----	Lantern.	30	
91	Bayou Grand Liard Post Light -----	29 20 (32) 89 28 (50)	Fixed white -----	Lantern.	33	
92	Harris Bayou Post Light -----	29 27 (14) 89 36 (26)	Fixed red -----	Tubular lantern.	30	
93	Socola Post Light -----		Fixed white -----	Lantern.	35	
94	Pointe à la Hache Post Light -----	29 32 (32) 89 45 (19)	Fixed red -----	Tubular lantern.	30	
95	Irontown Post Light -----	29 39 (01) 89 57 (34)	Fixed white -----	Tubular lantern.	30	
96	Poverty Point Post Light -----	29 39 (19) 89 57 (10)	Fixed red -----	Tubular lantern.	30	
97	McCall Flat Post Light -----	29 45 (50) 90 01 (03)	Fixed red -----	Tubular lantern.	30	
98	English Turn Bend Post Light -----	29 53 (05) 89 58 (08)	Fixed white -----	Lantern.	35	
99	Shingle Point Post Light -----	29 52 (50) 89 57 (44)	Fixed red -----	Tubular lantern.	35	
100	Poydras Hall Post Light -----	29 52 (24) 89 54 (01)	Fixed white -----	Tubular lantern.	30	
101	Saxonholm Post Light -----	29 55 (44) 89 55 (44)	Fixed white -----	Tubular lantern.	30	
102	Barataria Bay -----	29 16 21 89 56 50	Fixed white -----	4	50	13
103	Timbalier -----	29 02 (49) 90 21 (26)	Fixed white -----	Tubular lantern.	30	
104	SHIP SHOAL -----	28 54 56 91 04 15	Flashing white every 30 sec -----	2	105	16
105	SOUTHWEST REEF -----	29 23 36 91 30 14	Fixed white -----	4	54 1/2	13 1/4
106	Calcasieu -----	29 46 54 93 20 42	Fixed white -----	4	53	13 1/4
107	SABINE PASS -----	29 43 02 93 50 59	Fixed white, varied by a white flash every 90 sec.	3	84	14 1/2
108	Sabine Pass Jetty Beacon -----		Fixed red -----	Lantern.	24	
109	Galveston Light-Vessel, No. 28 -----	29 20 (48) 94 42 (63)	Fixed red -----	Ref'r	48	12 1/4
110	BOLIVAR POINT -----	29 22 03 94 46 01	Fixed white -----	2	117	15 1/4
111	Fort Point -----	29 20 16 94 46 01	Fixed white, with three fixed red and two dark sectors. One red sector between SW. by W. 1/2 W. and SSW., a dark sector between WSW. and W. 1/2 S., a red sector between W. and WNW. 1/2 W., a dark sector between WNW. 1/2 W. and NNW., and a red sector between NNE. and NNE. 1/2 E.	4	47 1/2	13 1/4

LIGHTHOUSES—FOG SIGNALS.

17

KEY WEST TO THE RIO GRANDE—Continued.

Number.	Color and peculiarity of lighthouse or vessel.	Height, in feet, from base of structure to center of lantern.	Fog signal.
82	Red, pyramidal, wooden framework, on four piles, surmounted by a house from which light is shown.		
83	Red, pyramidal framework, inclosing cylindrical dwelling and stairway.	105	
84	Brown, octagonal, pyramidal skeleton tower, with dwelling in lower part. Low frame building stands 80 feet SE. of tower. Temporary keeper's dwelling, wood, at end of wharf, $\frac{1}{2}$ mile NW.	126	
85	Black lantern on square, white dwelling with gable roof. Square, pyramidal fog-bell tower near N. side.	36	Bell struck by machinery; double blow, interval 10 sec.; single blow, interval 20 sec.
86	Square, black, pyramidal framework covered with horizontal slats.		
87	Wooden pile supporting a staff, on which hangs the lantern.	25	
88	White pole, with arm from which lantern is suspended, secured to bell tower.		Bell struck by machinery every 15 seconds.
89	White post with arm from which lantern is suspended.		
90	White post with arm from which lantern is suspended.		
91	White post with arm from which lantern is suspended.		
92	White post with arm from which lantern is suspended.		
93	White post with arm from which lantern is suspended.		
94	White post with arm from which lantern is suspended.		
95	White post with arm from which lantern is suspended.		
96	White post with arm from which lantern is suspended.		
97	White post with arm from which lantern is suspended.		
98	White post with arm from which lantern is suspended.		
99	White post with arm from which lantern is suspended.		
100	White post with arm from which lantern is suspended.		
101	White post with arm from which lantern is suspended.		
102	White, octagonal, pyramidal tower, 300 feet W. of Fort Livingston. Square dwelling with pyramidal roof, on easterly glacis of fort.	55	
103	Black, pyramidal framework structure. Dwelling, unpainted, 30 feet to westward of tower.		
104	Brown, pyramidal framework on pile foundation, inclosing cylindrical dwelling and stairway.		Bell struck by hand.
105	Square, pyramidal tower connected to square house, with pyramidal fog-bell tower rising from roof, all black, on screw-pile foundation.		Bell struck by machinery every 20 seconds.
106	Black, pyramidal tower, surmounted by lantern, on screw-pile foundation; white storehouse on wooden piles, on N. side of tower.	53	
107	White octagonal pyramidal tower with buttresses. Detached white frame dwelling with green blinds, on pile foundation, near tower.	75	
108	Framework of timber on four iron pipes.		
109	Two masts, schooner-rigged; black hoop-iron day mark at mainmasthead. Hull and spars, straw-color, with "GALVESON" in large, black letters on each side, and "23" on stern.		Bell struck by hand.
110	Conical tower colored with white and black horizontal bands; two white dwellings northeastward.	110	
111	White, hexagonal screw-pile structure; piles, red; blinds, green; lantern and dome, black.		

SAND KEY TO POINT ISABEL.

TABLE OF LIGHTS—Continued.

Number.	Name.	Latitude, north. Longitude, west.	Characteristics of light.	Order of light.	Height of light above sea level, in feet.	Distance visible, in nauti- cal miles.
112	GALVESTON BAY. { Halfmoon Shoal	29 24 02 94 51 00	Fixed white.	6	37	11½
113		29 30 (48) 94 52 (00)	Fixed white.	5	37½	11½
114	BRAZOS RIVER	28 55 (44) 95 13 (31)	Flashing white every 10 seconds.	3	98	15½
115	MATAGORDA	28 20 18 96 25 28	Flashing white every 90 seconds.	3	85½	14½
116	ARANSAS PASS	27 51 51 97 03 25	Fixed white.	4	65	13½
117	BRAZOS SANTIAGO (Padre Island)	26 04 16 97 10 00	Fixed white.	4	60	13½
118	POINT ISABEL	26 04 36 97 12 28	Fixed white, varied by a white flash every minute.	3	87	15

In the foregoing table the names of the lights are printed as follows, viz:

- 1st. PRIMARY SEACOAST LIGHTS.
- 2d. SECONDARY SEACOAST LIGHTS.
- 3d. *Light-vessels*.
- 4th. Sound, bay, and harbor lights.

The geographical positions of lighthouses which are uncertain by some seconds, not having yet been very accurately determined, and those of light-vessels, which vary somewhat in position, have the seconds inclosed thus: 35° 45' (57").

All bearings are *magnetic*, and in the case of visibility of lights given from seaward.

KEY WEST TO THE RIO GRANDE—Continued.

Number.	Color and peculiarity of lighthouse or vessel.	Height, in feet, from base of structure to center of lantern.	Fog signal.
112	White screw-pile structure; lantern, black.		Bell struck by machinery every 20 seconds.
113	Square, white screw-pile structure; lantern black.		Bell struck by machinery every 30 seconds.
114	Square pyramidal skeleton iron tower, brown from foundation to gallery floor; lantern, black.		
115	Black, conical tower; two white dwellings, a few yards to NE.	84	
116	Brown, octagonal, pyramidal tower; lantern, black; two dwellings near	55	
117	Hexagonal screw-pile structure; dwelling, slate-color; piles, roof, and lantern, black.	61	
118	White, conical brick tower; lantern, black; white frame dwelling about 125 feet to northward.	57	

In the column of "Distance visible, in nautical miles," will be found the distances at which the lights can be seen, under ordinary states of the atmosphere, by observers at elevations of 15 feet above the level of the sea.

In the column of "Characteristics of light," the time between flashes is given from beginning of one flash to the beginning of the next succeeding one, and bearings are given from seaward.

Vessels approaching or passing light-vessels of the United States in *foggy* or *thick weather* will be warned of their proximity by the sounding of a *bell, fog horn, or whistle*, on board of the light-vessels, at intervals not exceeding five minutes.

The fact should be noted that sound signals are not always reliable. The sound may be lost while really approaching it, after being heard; or even when approached until close-to, it may not be heard at all, though properly made. These conditions are the exception, not the rule. They are, however, always possible and render great care necessary.

KEY WEST TO THE RIO GRANDE.

BEARINGS AND DISTANCES.

The following bearings and distances serve to indicate relative positions of certain aids to navigation. An inspection of the charts will enable the mariner to select from the bearings given the ones which may be used as courses.

Dry Tortugas Lighthouse.—The following are bearings and distances from Dry Tortugas Lighthouse:

	Miles.
Sanibel Island Lighthouse, NNE	120
Charlotte Harbor Entrance buoy (bell), N. by E. $\frac{1}{2}$ E	127
Tampa Bay Entrance buoy (whistling), N. $\frac{1}{2}$ W	179 $\frac{1}{2}$
Cedar Keys Lighthouse, N. $\frac{3}{4}$ W	267 $\frac{1}{2}$
East Pass, St. George Sound, Outer buoy, N. by W. $\frac{1}{2}$ W	320 $\frac{1}{2}$
Cape St. George buoy (whistling), NNW. $\frac{1}{2}$ W	312
Pensacola Entrance buoy (whistling), NW. $\frac{1}{2}$ N	411 $\frac{1}{2}$
Mobile Outer buoy (whistling), NW. $\frac{1}{2}$ N. Northerly	429 $\frac{1}{2}$
Horn Island Pass Bar buoy (whistling), NW	448
South Pass Light-vessel, NW. by W. Northerly	428
Galveston Bar buoy (whistling), WNW. $\frac{1}{2}$ W	691 $\frac{1}{2}$
Brazos Santiago Outer Sea buoy, W. $\frac{1}{2}$ N	779 $\frac{1}{2}$
Habana, Morro Lighthouse bearing S. , distant 1 $\frac{1}{2}$ miles, SSE	92

Tampa Bay Entrance buoy (whistling).—The following are bearings and distances from Tampa Bay Entrance buoy:

	Miles.
East Pass, St. George Sound, Outer buoy, NW. $\frac{1}{2}$ N	159
Cape San Blas, bearing NNE. , distant 12 miles, NW. $\frac{1}{2}$ W	178
Pensacola Entrance buoy (whistling), NW. by W. $\frac{1}{2}$ W	283
Mobile Outer buoy (whistling), NW. by W. $\frac{1}{2}$ W	313
Horn Island Pass Bar buoy (whistling), NW. by W. $\frac{1}{2}$ W	336 $\frac{1}{2}$
Galveston Bar buoy (whistling), W. $\frac{1}{2}$ N	685
Rebecca Shoal Lighthouse, S. $\frac{1}{2}$ E	182 $\frac{1}{2}$
Key West, Entrance to, NW. Channel buoy (bell), S. by E. $\frac{1}{2}$ E	185 $\frac{1}{2}$

South Pass Light-vessel.—The following are bearings and distances from South Pass Light-vessel:

	Miles.
Cape San Antonio, bearing E. distant 5 miles, SSE. $\frac{1}{2}$ E. Easterly	481
Habana, Morro Lighthouse bearing S. , distant 1 $\frac{1}{2}$ miles, SE. $\frac{1}{2}$ E	504 $\frac{1}{2}$
Key West, Entrance to, NW. Channel buoy (bell), SE. by E. $\frac{3}{4}$ E	467 $\frac{1}{2}$
Tampa Bay Entrance buoy (whistling), E. $\frac{1}{4}$ S	841 $\frac{1}{2}$
Cape San Blas, bearing NNE. , distant 12 miles, ENE. $\frac{1}{2}$ E	194 $\frac{1}{2}$
Cape San Blas Outer Shoal buoy, ENE. $\frac{1}{2}$ E	200 $\frac{1}{2}$
Pensacola Entrance buoy (whistling), NE. $\frac{1}{2}$ E	128 $\frac{1}{2}$
Mobile Outer buoy (whistling), NE. by N. Easterly	89 $\frac{1}{2}$

VARIATION OF THE COMPASS.

The magnetic variations for 1897, and annual decrease at points mentioned, are as follows:

LOCALITY.	Variation.	Annual decrease.
Key West, Fla.	2 $\frac{1}{2}$ E.	3
Dry Tortugas, Fla.	2 $\frac{1}{2}$	3
Off Cape Romano, Fla.	2 $\frac{1}{2}$	3
Off Charlotte Harbor, Fla.	2 $\frac{1}{2}$	3
Off Tampa Bay, Fla.	2 $\frac{1}{2}$	3
Off Cedar Keys, Fla.	2 $\frac{1}{2}$	3 $\frac{1}{2}$
Off East Pass, Apalachicola Bay, Fla.	3 $\frac{1}{2}$	3 $\frac{1}{2}$
Off St. Andrews Bay, Fla.	3 $\frac{1}{2}$	4
Pensacola Bay entrance, Fla.	4 $\frac{1}{2}$	4 $\frac{1}{2}$
Mobile Bay entrance, Ala.	4 $\frac{1}{2}$	4 $\frac{1}{2}$
Horn Island Pass, Miss.	4 $\frac{1}{2}$	4 $\frac{1}{2}$
Ship Island Harbor, Miss.	4 $\frac{1}{2}$	4 $\frac{1}{2}$
Lake Pontchartrain, La.	5 $\frac{1}{2}$	4 $\frac{1}{2}$
South Pass, Mississippi River, La.	5	4 $\frac{1}{2}$
Atchafalaya Bay entrance, La.	5 $\frac{1}{2}$	4
Sabine Pass, Tex.	6 $\frac{1}{2}$	4
Galveston, Tex.	7	4
Brazos River entrance, Tex.	7 $\frac{1}{2}$	4
Pass Cavallo, Tex.	7 $\frac{1}{2}$	3 $\frac{1}{2}$
Aransas Pass, Tex.	7 $\frac{1}{2}$	3
Brazos Santiago, Tex.	7 $\frac{1}{2}$	2 $\frac{1}{2}$

TABLES.

21

TIDES.

GENERAL TABLE.*

Note.†—Tropic tides are those which occur near the time of the moon's greatest declination, either north or south. The tropic lunitidal intervals are marked *a* or *b*.

a Indicates that an upper transit goes with a north declination and a lower transit with a south declination.

b Indicates that a lower transit goes with a north declination and an upper transit with a south declination.

The plane of reference referred to in the table is the plane on which the soundings on Coast and Geodetic Survey charts are based, commonly termed the plane of mean low water.

At places where the tides are chiefly diurnal (only one high and one low water in 24 hours), the interval and range of the semidiurnal tides (the two small high and low waters which occur near the times of the moon's zero declination) at these places are inclosed by brackets.

To find the time of high or low water.—At places on the west coast of Florida to the southward of Apalachee Bay use the Lunitidal Intervals under "Mean Tides" for a period of 2 days before and 4 days after the moon's zero declination and use the Lunitidal Intervals under "Tropic Tides" at other times.

At places to the westward of Apalachee Bay near the time of the moon's zero declination the tides are usually so small that, for practical purposes, during a period of 2 days before and 4 days after zero declination they need not be taken into account. At other times the Lunitidal Intervals under "Tropic Tides" should be used.

LOCALITY.	LUNITIDAL INTERVAL.				RISE AND FALL.		
	MEAN TIDES.		TROPIC TIDES.		Mean tides.	Rise of higher high water above plane of reference.	Fall of lower low water below plane of reference.
	High water.	Low water.	Higher high water.	Lower low water.			
	<i>h.</i> <i>m.</i>	<i>h.</i> <i>m.</i>	<i>h.</i> <i>m.</i>	<i>h.</i> <i>m.</i>	<i>Feet.</i>	<i>Feet.</i>	<i>Feet.</i>
Key West Harbor.....	8 58	2 46	8 44 <i>b</i>	3 33 <i>a</i>	1.2	1.6	0.1
Dry Tortugas.....	9 44	3 22	8 51 <i>b</i>	4 12 <i>a</i>	1.1	1.6	0.5
Cape Sable.....	1 05	7 26	0 56 <i>a</i>	7 56 <i>a</i>	2.9	3.4	0.2
Cape Romano.....	0 15	6 36	0 05 <i>a</i>	7 10 <i>a</i>	2.6	3.1	0.2
Punta Rasa, San Carlos Bay.....	12 19	6 12	12 06 <i>b</i>	6 55 <i>a</i>	1.6	2.0	0.1
Charlotte Harbor { Boca Grande.....	0 42	6 19	0 26 <i>a</i>	7 11 <i>a</i>	1.1	1.4	0.1
Punta Gorda.....	2 00	7 40	1 47 <i>a</i>	8 25 <i>a</i>	1.4	1.8	0.1
Egmont Key, Tampa Bay entrance.....	11 32	5 07	10 33 <i>b</i>	5 39 <i>a</i>	1.4	1.8	0.5
Hillsboro Bay, Tampa Bay.....	1 20	8 50	0 33 <i>a</i>	9 15 <i>a</i>	2.2	2.6	0.7
Anclote.....	11 20	5 05	10 31 <i>b</i>	5 32 <i>a</i>	2.0	2.3	0.7
Cedar Keys.....	0 43	7 13	0 00 <i>a</i>	7 37 <i>a</i>	2.4	2.8	0.7
St. Marks.....	1 38	7 38	0 49 <i>a</i>	8 02 <i>a</i>	2.5	3.5	0.1
Apalachicola Bay.....	[12 10]	[5 35]	10 25 <i>b</i>	9 27 <i>a</i>	[0.8]	2.3	0.2
St. Andrews Bay.....	[11 35]	[5 05]	9 48 <i>b</i>	9 01 <i>a</i>	[0.3]	1.8	0.2
Pensacola.....	[11 43]	[4 34]	9 51 <i>b</i>	8 40 <i>a</i>	[0.1]	1.6	0.2
Mobile Bay entrance.....	[11 26]	[5 06]	9 19 <i>b</i>	11 10 <i>a</i>	[0.1]	1.4	0.1
Mobile, City of.....	[1 35]	[6 50]	12 13 <i>b</i>	10 46 <i>a</i>	[0.5]	1.9	0.2
Horn Island, Pascagoula Harbor entrance.....	[12 00]	[5 40]	10 13 <i>b</i>	9 36 <i>a</i>	[0.3]	1.8	0.2
Biloxi, Mississippi Sound.....	[1 01]	[6 00]	9 54 <i>b</i>	8 08 <i>a</i>	[0.3]	2.0	0.2
Port Eads, Mississippi River.....	[10 55]	[4 42]	8 15 <i>b</i>	7 04 <i>a</i>	[0.1]	1.6	0.1
Barataria Bay.....	[11 00]	[4 47]	8 36 <i>b</i>	6 55 <i>a</i>	[0.4]	1.9	0.2
Atchafalaya Bay entrance.....	[0 40]	[6 56]	2 58 <i>a</i>	6 31 <i>a</i>	[0.5]	2.0	0.0
Calcasieu Pass.....	2 09	8 44	4 00 <i>b</i>	8 00 <i>a</i>	1.3	2.2	0.5
Sabine Pass.....	3 25	9 46	5 22 <i>b</i>	8 45 <i>a</i>	0.7	1.4	0.2
Galveston, City of.....	[4 16]	[10 38]	6 56 <i>b</i>	10 05 <i>a</i>	[0.6]	1.2	0.3
Brazos River.....	[4 15]	[10 30]	6 46 <i>b</i>	10 03 <i>a</i>	[0.7]	1.5	0.1
Pass Cavallo.....	[4 35]	[10 47]	7 06 <i>b</i>	10 20 <i>a</i>	[0.7]	1.5	0.1
Aransas Pass.....	[4 25]	[10 35]	6 56 <i>b</i>	10 08 <i>a</i>	[0.8]	1.5	0.1
Brazos Santiago.....	[2 00]	[8 10]	5 07 <i>b</i>	7 36 <i>a</i>	[0.3]	1.0	0.1
Rio Grande entrance.....	[1 55]	[8 03]	4 35 <i>b</i>	7 34 <i>a</i>	[0.4]	1.3	0.1

* Tide tables, published annually by the United States Coast and Geodetic Survey, predicting the times and heights of tides for every day of the year, at all the principal ports, can be obtained from the agents named in the list given on pages 7, 8; price \$0.50.

† See, also, the remarks on tides, page 23.

GULF OF MEXICO.

WIND SIGNAL DISPLAY STATIONS.

The wind signals of the United States Weather Bureau are shown for the benefit of mariners at the following stations. The signals are described and their meaning is explained in Appendix II.

Key West, Fla.*	Apalachicola, Fla.†	Moss Point, Miss.†	Galveston, Tex.*
Punta Gorda, Fla.†	Pensacola, Fla.*	Pass Christian, Miss.†	Velasco, Tex.†
Port Tampa, Fla.†	Fort Morgan, Ala.†	Bay St. Louis, Miss.†	Port Lavaca, Tex.†
Tampa, Fla.*	Mobile, Ala.*	Quarantine Sta. Rigolets, La.†	Rockhart, Tex.†
Cedar Keys, Fla.†	Pascagoula, Miss.†	Port Eads, La.†	Corpus Christi, Tex.*
Carrabelle, Fla.†	Scranton, Miss.†	New Orleans, La.*	Brownsville, Tex.†

UNITED STATES LIFE-SAVING STATIONS.

The following list of life-saving stations has been corrected to January 1, 1897. The geographical positions given are approximate and are taken from the Official Register of the service. These stations are furnished with life boats, mortars, and all other appliances for affording assistance in cases of shipwreck. †

NAME OF STATION.	STATE.	LOCALITY.	APPROXIMATE POSITION.					
			Latitude, north.			Longitude, west.		
Santa Rosa.....	Fla...	Santa Rosa Island, 3 miles E. of Fort Pickens.....	30	19	00	87	14	30
Sabine Pass.....	Tex...	West side of pass.....	29	43	55	93	52	15
Galveston.....	Tex...	East end Galveston Island.....	29	20	10	94	46	10
San Luis.....	Tex...	West end Galveston Island.....	29	07	00	95	04	00
Velasco.....	Tex...	2½ miles northeast of mouth of Brazos River.....	28	57	45	95	16	30
Saluria.....	Tex...	Northeast end Matagorda Island.....	28	23	00	96	24	00
Aransas.....	Tex...	Northeast end Mustang Island.....	27	51	00	97	03	00
Brazos.....	Tex...	North end Brazos Island, entrance to Brazos Santiago.	26	04	00	97	08	00

GENERAL REMARKS FOR APPROACHING AND SAILING ALONG THE COAST OF THE UNITED STATES IN THE GULF OF MEXICO.

Soundings.—A frequent use of the lead is of the greatest value in giving warning of danger either when approaching or sailing along the coast. Off the west coast of Florida, between Dry Tortugas and Cape St. George, the 100-fathom curve is from 90 to 140 miles offshore and the 10-fathom curve from 10 to 40 miles offshore. Along this stretch of the coast, large vessels, well-found in ground tackle, can anchor in about 7 fathoms of water and ride out a gale from any direction; vessels standing along the coast, in ballast, and headed by the wind, sometimes find it to their advantage to anchor and wait for a favorable breeze instead of beating to windward.

In the broad bight between Cape San Blas and the Passes of the Mississippi, the 100-fathom curve is from 30 to 60 miles offshore; the 10-fathom curve is only about 1 mile offshore between St. Andrews and Pensacola bays, while from Pensacola Bay to Pascagoula entrance it averages about 5 miles from the shore. The water inside the 100-fathom curve shoals gradually and regularly when approaching the coast. If approaching in the night, or in thick weather, and not sure of the vessel's position, it is advisable to keep in a depth of at least 15 fathoms until daylight, or until the weather clears.

Off the Passes of the Mississippi the 100-fathom curve approaches South Pass as close as 10 miles, while the 10-fathom curve is in some places less than 1 mile from the mouths of the passes and the shoals between them. Here, the discolored water discharged by the Mississippi River is liable to mislead the navigator in his judgment as to his distance from the passes; at times this discolored water may be encountered 12 miles, at other times 50 miles, from the passes.

To the westward of the Passes of the Mississippi and as far as Timbalier Island, the 100-fathom curve is about 40 miles offshore and the 10-fathom curve is at an average distance of 8 miles.

* Stations in charge of regular Weather Bureau observers.

† Special wind signal display stations.

‡ Instructions to enable mariners to avail themselves fully of the assistance thus afforded will be sent free of charge upon application to the General Superintendent of the Life-Saving Service, Washington, D. C.

Between Timbalier Island and Galveston Entrance the 100-fathom curve is from 60 to 110 miles, and the 10-fathom curve from 20 to 38 miles, offshore. Along this stretch of the coast are several shoals which lie at distances of 10 to 28 miles offshore; one of these shoals is as close as 5 miles to the 10-fathom curve. Deep draft vessels should approach the coast in this vicinity with caution and obtain frequent soundings, hauling offshore if, on a clear day, they shoal their water to 5 fathoms without being able to see land. (See the descriptions of Ship Shoal, Trinity Shoal, and Sabine Bank, in another part of this volume.)

From off Galveston Entrance to the mouth of the Rio Grande the 100-fathom curve is from 50 to 90 miles offshore; the 10-fathom curve, off Galveston Entrance, is about 23 miles offshore, but to the westward, from San Luis Pass to the Rio Grande, it is only from 4 to 8 miles offshore. This stretch of coast has no outlying shoals and in clear weather can safely be approached close enough to make the land.

Tides.—The tides in the Gulf of Mexico differ from those on the Atlantic Coast of the United States in being more greatly influenced by the declination of the moon. Along the west coast of Florida, where, as a general rule, the rise and fall of the tide is greater than to the westward of Apalachee Bay, the effect of declination is shown by a marked difference between the heights of consecutive high or low waters. To the westward of Apalachee Bay there is usually only one high and one low water in 24 hours.

On the west coast of Florida, from Key West to Apalachee Bay, there are usually two well defined high tides in 24 hours. In this region the relative height of consecutive tides may be ascertained by noting the declination and the transit of the moon, there being four possible cases:

1. With north declination, a high water following the moon's upper transit will be lower than the preceding or following high water.
2. With north declination, a high water following the moon's lower transit will be higher than the preceding or following high water.
3. With south declination, a high water following the moon's upper transit will be higher than the preceding or following high water.
4. With south declination, a high water following the moon's lower transit will be lower than the preceding or following high water.

North or south declination means here that the moon is quite far north or south of the equator. It is here assumed that the period by which a high water follows the moon's transit is never much less than 7 hours nor much more than 13 hours.

On the Gulf Coast, to the westward of Apalachee Bay, there is generally but one low and one high water in 24 hours. The duration of fall, or interval of time from high to low water, is less by some hours than the duration of rise, except for some limited areas where the reverse occurs. The rise and fall of tide is greater when the moon is far from the equator, either north or south, and if the moon's greatest declination occurs at full and change the range will be greatest. About the time that the moon's declination is zero the rise and fall is less, and if the moon's zero declination occurs in its first and last quarter the range will be least. When the moon is near the equator there are sometimes four small tides in 24 hours; this may be expected when new or full moon occurs at that time. With north declination a high water generally follows the moon's lower transit, and with south declination it follows the moon's upper transit.

The above remarks apply when there is no disturbing action of the wind. Strong winds will nearly always retard or accelerate the tides, and at times during heavy gales the action of the tides will, apparently, be suspended or reversed.

Coast and Tidal Currents.—Along the coast of the United States bordering on the gulf, the currents are almost entirely influenced by the force and direction of the winds. The normal tidal currents are weak except in the entrances to the bays and harbors; here, in some cases, they have a velocity of $1\frac{1}{2}$ to 2 knots, but this velocity is decreased or accelerated greatly by the force and direction of the winds. After a norther a strong current will be found setting over the bars and into the harbors and bays. The influence of the Gulf Stream can not usually be felt in the Gulf of Mexico north of the latitude of the Dry Tortugas.

The prevailing winds along the coast of the United States which borders the Gulf of Mexico between Key West and the passes of the Mississippi, are northerly from October to February, both inclusive, and southerly during the remaining months of the year. To the westward of the passes of the Mississippi, they are northerly from November to February, and southerly during the remaining months.

Northers are violent north winds which blow, mainly during the winter months, over Texas and the Gulf of Mexico. These winds come on after but short warning, and usually follow light southerly breezes and warm, moist weather. The indications of a norther are a thick bank of dark clouds in the north or northwest with lightning, falling barometer, and lowering temperature; it begins with a strong squall, which usually strikes the observer when the bank of clouds is at an altitude of 45 degrees above the horizon. During this squall the temperature may drop 20 degrees in 10 minutes. After the first squall the wind gradually increases but does not reach its maximum velocity until after the barometer has begun to rise; the temperature, however, may drop as low as 18° F. The northers are more frequent and more strongly marked along the coast of Texas than to the eastward, but the general characteristics of these winds are alike all over the Gulf of Mexico; their duration is from one to four days. There are two types of northers, known locally as "Dry Norther" and "Wet Norther"; the indications are practically the same for both, except that a wet norther is usually preceded by rain, perhaps a thunderstorm; the shift of wind to the northward is more sudden and the squall accompanying the shift generally heavy. This type is confined mostly to the eastern part of the gulf and is not as common as the other. Northers are not dangerous for large vessels but small vessels are sometimes blown offshore; they affect, however, the depth of water in the harbors and on the bars by blowing the water offshore; in some cases the water will be lowered 4 feet. This should be borne in mind by vessels attempting to enter the harbors on the gulf coast during or just after a norther.

Southeast gales are dangerous to shipping along the Gulf Coast of the United States to the westward of Apalachee Bay. They are liable to occur at any time of the year, but are most dangerous in winter and early spring. During a heavy southeaster the bars at the entrances to the harbors are made impassable for deep draft vessels on account of the heavy sea which breaks in depths of about 4 fathoms. The usual local indication of a southeaster is a breeze freshening at **ENE.** or **E.** and hauling to the southward, accompanied by a falling barometer, a rising temperature, and an increasing swell. The lowest reading of the barometer is usually reached immediately after the wind gains its maximum velocity at **SE.** When the wind hauls to the southward of **SE.** it is an indication that the gale is breaking, which is usually followed by heavy squalls; as it hauls to the westward of **S.** first rain squalls, and then clearing weather, may be expected, unless, as is sometimes the case, the southeaster be followed by a norther. Southeast gales raise the water in the harbors along the Gulf Coast, in some cases, to a height of 6 feet above the normal. Along the west coast of Florida, from Cape Romano to Apalachee Bay, southeast gales are not so dangerous to shipping; vessels well found in ground tackle can anchor in shoal water under the lee of the land and hold on until the gale abates.

West India Hurricanes.—Occasionally during July, August, September, and October, and at rare intervals in June and November, great whirlwinds, known as hurricanes, may be encountered in the Gulf of Mexico. In addition to a motion around its center, a hurricane has a progressive motion, following a track which, in the part of the Gulf of Mexico treated in this volume, usually has a direction between **N.** and **E.**, although some have been known to travel in a direction to the westward of **N.** This progressive motion varies in velocity, but is said to average about 300 miles in 24 hours; the diameter of a hurricane may vary from 100 to 300 miles, the diameter of its center being also a variable quantity. Shipping and property in the track of a hurricane seldom escape without damage or destruction, as, in addition to the force of the wind, it may be that a wave, moving forward like a tidal wave at the rate of the hurricane's progress, accompanies the hurricane in its track; this causes sudden inundations along the low shores of the Gulf of Mexico lying in the track of the hurricane, and endangers the shipping at anchor. During the hurricane season the mariner should note every change in the weather signs and carefully watch his barometer

for indications of a hurricane, so as to take every precaution to avoid it when at sea, or to make preparations for riding it out in safety when at anchor in port. For the indications of the approach of a hurricane and the rules to be followed by vessels when overtaken by one, see Appendix III.

SAILING DIRECTIONS FOR THE COAST OF THE GULF OF MEXICO FROM THE FLORIDA KEYS AND DRY TORTUGAS TO THE RIO GRANDE.

The routes taken by vessels bound along the coast will depend greatly on their port of destination. The directions for coasting are given in sections, as follows:*

Sections 1, 1 A, 1 B, and 1 C include the coast from the Florida Keys and Dry Tortugas to Tampa Bay.

Sections 2 and 2 A include the coast from Tampa Bay to Cape San Blas.

Sections 3, 3 A, and 3 B include the coast from Cape San Blas to the South Pass of the Mississippi River.

Section 4 includes the coast from the South Pass of the Mississippi River to Galveston Entrance.

Section 5 includes the coast from Galveston Entrance to the Rio Grande.

1. From the Bell Buoy off Entrance to Northwest Passage into Key West.—I. To Big Marco Pass Outer buoy.—Make good a **N. $\frac{1}{2}$ E.** course for 78 miles.

II. To the Entrance buoy off San Carlos Bay.—Make good a **N. $\frac{3}{4}$ W.** course for 105 $\frac{1}{2}$ miles.

III. To the Entrance bell buoy off Boca Grande entrance to Charlotte Harbor.—Make good a **N. by W. $\frac{1}{2}$ W.** course for 124 miles.

IV. To the Entrance whistling buoy off North Channel entrance to Tampa Bay.—Make good a **N. by W. $\frac{3}{4}$ W.** course for 185 $\frac{1}{2}$ miles.

Remarks.—These directions lead well clear of the land and all dangers. When approaching the entrance to any harbor, the sailing directions under the heading of that harbor should be consulted. When approaching the North Channel entrance to Tampa Bay, special care should be taken to avoid Palatine Shoal.

1 A. From a position 1 3-4 miles W. from Rebecca Shoal Lighthouse.—I. To the Entrance buoy off San Carlos Bay.—Make good a **N. by E. $\frac{3}{4}$ E.** course for 115 miles.

II. To the Entrance bell buoy off Boca Grande entrance to Charlotte Harbor.—Make good a **N. $\frac{3}{4}$ E.** course for 126 $\frac{1}{2}$ miles.

III. To the Entrance whistling buoy off the North Channel entrance to Tampa Bay.—Make good a **N. $\frac{3}{4}$ W.** course for 182 miles.

Remarks.—See the remarks under section 1, preceding.

1 B. From a position 3 miles W. of Dry Tortugas Lighthouse.—I. To the Entrance buoy off San Carlos Bay.—Make good a **NNE. $\frac{1}{2}$ E.** course for 120 miles.

II. To the Entrance bell buoy off Boca Grande entrance to Charlotte Harbor.—Make good a **N. by E. $\frac{1}{2}$ E.** course for 127 $\frac{1}{2}$ miles.

III. To the Entrance whistling buoy off North Channel entrance to Tampa Bay.—Make good a **N.** course for 178 $\frac{1}{2}$ miles.

Remarks.—In passing to the westward of the Dry Tortugas it is advisable to give the lighthouse and Loggerhead Key a berth of at least 3 miles. (See the remarks under section 1, preceding.)

1 C. From Big Marco Pass to the Entrance Whistling Buoy off North Channel Entrance to Tampa Bay.—Along the shore.—From the Outer buoy off Big Marco Pass, steer **NNW. $\frac{1}{2}$ W.** for 30 miles; this will lead to the Entrance buoy off San Carlos Bay. Pass $\frac{1}{2}$ mile to the southward of this buoy and steer **W. $\frac{1}{2}$ S.** for 11 miles, and then make good a **NNW. $\frac{1}{2}$ W.** course for 82 miles. This should lead to the whistling buoy off the entrance to Tampa Bay.

* See the "General remarks for approaching and sailing along the coast of the United States in the Gulf of Mexico," pages 22-25.

Remarks and dangers.—The **NNW. $\frac{1}{2}$ W.** course from Big Marco Pass leads clear of all dangers; Sanibel Island Lighthouse should be made on the port bow, and the water should not be shoaled to less than 3 fathoms. When the entrance buoy off San Carlos Bay is sighted, steer for it.

On the **W. $\frac{1}{2}$ S.** course, the shore of Sanibel Island should not be approached closer than 1 mile.

On the **NNW. $\frac{3}{4}$ W.** course, the vessel should be about $1\frac{1}{2}$ miles from the shore when abreast Blind Pass, and this is as close as she should approach it. The course gradually draws offshore and care should be taken to pass at least 4 miles from Gasparilla Lighthouse, when it is abeam, and outside the bell buoy off Boca Grande. From this bell buoy to the North Channel entrance to Tampa Bay, the **NNW. $\frac{1}{2}$ W.** course leads from 4 to 5 miles offshore, but the coast is free from dangers and can be approached as close as $1\frac{1}{2}$ miles carrying a depth of 4 fathoms; this is as close as is safe for a stranger.

When approaching the entrance to Tampa Bay care should be taken to keep outside of the shoals which make offshore for a distance of 5 miles. Palatine Shoal lies 5 miles **W.** from Egmont Key Lighthouse and $\frac{1}{2}$ mile **SSE.** from the whistling buoy at the entrance to the North Channel.

2. From the Whistling Buoy off the Entrance to North Channel into Tampa Bay.—I. To entrance to Cedar Keys.—Make good a **N.** by **W. $\frac{1}{2}$ W.** course for $16\frac{1}{2}$ miles, when Highlands Shoal buoy (can, red, "Highlands" in white letters) should be $\frac{1}{2}$ mile distant on the starboard beam. Then make good a **N.** by **W. Northerly** course for 68 miles; Cedar Keys Lighthouse should then bear **N.** by **E.** and be distant about $5\frac{1}{2}$ miles.

Remarks.—These directions lead clear of all dangers; care should be taken not to approach too close to Seahorse Reef (see sailing directions for Cedar Keys), and as soon as Cedar Keys Lighthouse is made it should be brought to bear **N.** by **E.** and stood for on this bearing.

II. To the Sea buoy off, St. Marks River entrance.—Make good a **NNW. $\frac{1}{2}$ W.** course for 161 miles, which will lead to the Sea buoy, with St. Marks Lighthouse bearing **N. $\frac{3}{4}$ W.**, distant nearly 3 miles.

III. To the Outer buoy at the entrance to East Pass, Apalachicola Bay.—Make good a **NW. $\frac{1}{2}$ N.** course for $159\frac{1}{2}$ miles, which will lead to the Outer buoy off the entrance to East Pass and on to the Crooked River Range for entering the pass.

Remarks.—When approaching East Pass, as soon as Crooked River Lighthouse is sighted, bring the lighthouse to bear **NNW. $\frac{1}{2}$ W.** and approach the Outer buoy on this bearing.

IV. To the whistling buoy off Cape St. George.—Make good a **NW. $\frac{3}{4}$ W.** course for 161 miles; this will lead to the whistling buoy, with Cape St. George Lighthouse bearing **N. $\frac{1}{2}$ W.**, distant 7 miles.

V. To a position from which Cape San Blas bears **NNE.**, distant 12 miles.—Make good a **NW. $\frac{3}{4}$ W.** course for 178 miles.

Remarks.—Deep draft vessels, in a heavy sea, should not, when approaching Cape San Blas, shoal the water to less than 10 fathoms. The shoal which extends for 13 miles in a **SSW. $\frac{1}{2}$ W.** direction from the cape has depths of 6 fathoms near its outer end, and 4 fathoms are found $9\frac{1}{2}$ miles from the cape.

2 A. From the Whistling Buoy off the Entrance to the North Channel into Tampa Bay to the Buoy off Cape San Blas.—Along the shore.—From the whistling buoy steer **N.** by **W. $\frac{1}{2}$ W.** for $16\frac{1}{2}$ miles. When Highlands Shoal buoy bears **E.**, distant $\frac{1}{2}$ mile, steer **N.** by **W. $\frac{1}{2}$ W.** for $64\frac{1}{2}$ miles, until up to the bell buoy off Seahorse Reef. From the latter buoy, steer **NW. $\frac{1}{2}$ W.** for 75 miles, until up to Ocklockonee Shoals Sea buoy; from this buoy steer **SW.** by **W. $\frac{3}{4}$ W.** for 52 miles, until up to the whistling buoy off Cape St. George; and from the latter steer **WNW. $\frac{1}{2}$ W.** for $17\frac{1}{2}$ miles, to the buoy off Cape San Blas.

Remarks.—These directions should not be followed by vessels of over 12 feet draft in a heavy sea. When approaching the bell buoy off Seahorse Reef, spots with as little as 19 feet of water over them may be encountered. After passing Highlands Shoal buoy no land will be sighted until after Ocklockonee Shoal Sea buoy has been passed and the vessel is standing on the **SW.** by **W. $\frac{1}{2}$ W.** course. Lighthouse Point will be left nearly 7 miles on the starboard hand on this course; on a clear day the point, which is wooded, can be seen. South Shoal Sea buoy, which marks the shoal making to the southward from Lighthouse Point, should be left about $1\frac{1}{2}$ miles on the starboard hand. On a clear day the wooded parts of Dog Island and St. George Island will be seen; Cape St. George Lighthouse should be left 7 miles on the starboard hand. When standing for the buoy off Cape San Blas, spots with 4 fathoms of water over them are liable to be encountered to the southward and westward of the buoy.

3. *From Cape San Blas Outer Shoal Buoy.*—I. To Entrance buoy off St. Andrews Bay.—Make good a **NNW. $\frac{1}{2}$ W.** course for $32\frac{1}{2}$ miles.

II. To the whistling buoy off the entrance to Pensacola Bay.—Make good a **WNW. $\frac{1}{2}$ W.** course for 110 miles.

III. To the whistling buoy off the entrance to Mobile Bay.—Make good a **W. $\frac{1}{2}$ N.** course for 145 miles.

IV. To the entrance to Pascagoula Harbor.—Make good a **W. $\frac{1}{2}$ N.** course for 168 miles; Horn Island Lighthouse should then bear **NW.** and be distant $2\frac{1}{2}$ miles.

V. To a position off the entrance to Ship Island Harbor.—Make good a **W. $\frac{1}{2}$ N.** course for 193 miles; Ship Island Lighthouse will then bear **N.**, distant $3\frac{1}{2}$ miles.

Remarks.—The courses in paragraphs I to V, preceding, lead clear of all dangers. In approaching the entrance to any harbor, the sailing directions for that harbor should be consulted.

3 A. *From a position, in 8 fathoms of water, 12 miles SSW. from Cape San Blas.*—I. To the whistling buoy off the entrance to Pensacola Bay.—Make good a **WNW.** course for $106\frac{1}{2}$ miles.

II. To the whistling buoy off the entrance to Mobile Bay.—Make good a **WNW. $\frac{1}{2}$ W.** course for $140\frac{1}{2}$ miles.

III. To the entrance to Pascagoula Harbor.—Make good a **W. by N.** course for 164 miles; Horn Island Lighthouse should then bear **NW.** and be distant $2\frac{1}{2}$ miles.

IV. To a position off the entrance to Ship Island Harbor.—Make good a **W. $\frac{1}{2}$ N.** course for 188 miles; Ship Island Lighthouse will then bear **N.**, distant $3\frac{1}{2}$ miles.

V. To the light-vessel off the South Pass of the Mississippi River.—Make good a **WSW. $\frac{1}{2}$ W.** course for 194 miles.

Remarks.—See the remarks under paragraph V in section 3, preceding.

3 B. *From Cape San Blas to the South Pass of the Mississippi.*—Along the shore.—From the buoy off Cape San Blas, steer to the westward 1 mile and then **N.** by **W. $\frac{1}{2}$ W.** for about 17 miles, until St. Josephs Point bears **ENE.** Then steer **NW. $\frac{1}{2}$ W.** about 20 miles; the four pines near the western entrance to St. Andrews Bay will then be abeam and the vessel should be about $1\frac{1}{2}$ miles from the beach. From this position the shore can be followed, giving it a berth of $1\frac{1}{2}$ miles, or more, until up to Pensacola Bay entrance, where the vessel should be hauled offshore so as to pass close to the whistling buoy. From the whistling buoy off Pensacola Bay entrance, steer **WSW. $\frac{1}{2}$ W.** for $39\frac{1}{2}$ miles, to the whistling buoy off Mobile Bay entrance; from the latter steer **W.** for 25 miles, to a position from which Horn Island Lighthouse bears **NW.**, distant 2 miles. From this position steer **S. by W. $\frac{1}{2}$ W.** for $71\frac{1}{2}$ miles, taking care to leave Pass a Loutre Lighthouse at least 5 miles on the starboard hand when it is abeam. Having stood 6 miles on the **S. by W. $\frac{1}{2}$ W.** course after Pass a Loutre Lighthouse bore abeam, steer **SW.** for the light-vessel off South Pass.

Remarks.—On the **N. by W. $\frac{1}{2}$ W.** course, the land to the northward of Cape San Blas is left about $1\frac{1}{2}$ miles on the starboard hand. St. Josephs Point is wooded nearly to its end and the northern end of the tree line can be taken for the bearing on which to change the course to **NW. $\frac{1}{2}$ W.** On the latter course, the entrances to St. Josephs and St. Andrews bays will be passed; after passing the latter, the curve of the coast can be followed at a distance of $1\frac{1}{2}$ miles or more, until up to Pensacola Bay entrance. Care should be taken to pass outside the whistling buoy off Mobile Bay entrance.

On the **S. by W. $\frac{1}{2}$ W.** course, from off Pascagoula entrance, the course leads $7\frac{1}{2}$ miles to the eastward of Chandeleur Islands and no land will be sighted until Pass a Loutre Lighthouse is made.

4. *From South Pass Light-vessel.*—I. To entrance of Barataria Bay.—Steer **SW.** by **W. $\frac{1}{2}$ W.** until Southwest Pass Lighthouse bears **N.**, distant $4\frac{1}{2}$ miles; then steer **NW.** by **W. $\frac{1}{2}$ W.** for 34 miles. Barataria Bay Lighthouse should then bear about **NW.** by **N.**, distant 3 miles.

II. To entrance of Atchafalaya Bay.—Steer **SW.** by **W.** $\frac{1}{4}$ **W.** until Southwest Pass Lighthouse bears **N.**, distant $4\frac{1}{2}$ miles; then steer **W.** $\frac{1}{4}$ **S. Southerly** for 88 miles; Ship Shoal Lighthouse should then bear **S.**, distant $1\frac{1}{2}$ miles. From this position steer **WSW. Southerly** for $11\frac{1}{2}$ miles and then **NNW.** $\frac{1}{4}$ **W.** for nearly 30 miles with Southwest Reef Lighthouse directly ahead.

Remarks.—The directions in paragraph II are intended only for vessels that can enter Atchafalaya Bay, but vessels of 13 feet draft can pass between Ship Shoal and the shoals to the northward. On the **W.** $\frac{1}{4}$ **S.** course, care should be taken not to approach the northern edge of Ship Shoal too closely, as it rises abruptly from a depth of 5 fathoms.

III. To Calcasieu Pass, for vessels of 8 feet or less draft.—Steer **SW.** by **W.** $\frac{1}{4}$ **W.** until Southwest Pass Lighthouse bears **N.**, distant $4\frac{1}{2}$ miles; then steer **W.** $\frac{1}{4}$ **S. Southerly** for 94 miles, passing **N.** of Ship Shoal and leaving Ship Shoal Lighthouse $1\frac{1}{2}$ miles on the port hand. Having continued this course till 6 miles to the westward of the lighthouse, steer **NW.** by **W.** $\frac{3}{4}$ **W.** for $43\frac{1}{2}$ miles, to the red can buoy marking Shell Keys; from this buoy, which should be left $\frac{1}{4}$ mile on the starboard hand, steer **W. Southerly** for 18 miles, leaving Tiger Shoal buoy (can, black) about 1 mile on the starboard hand. When the water deepens to 18 feet or more, steer **WNW.** $\frac{1}{4}$ **W.** for 63 miles, which will lead to the entrance of Calcasieu Pass.

Remarks.—These directions, if closely followed, will carry a least depth of 12 feet; this depth will be found after passing Tiger Shoal buoy, while standing on the **W. Southerly** course. Care must be taken to sight the red buoy to the southward of the Shell Keys, as it is impossible for a stranger to locate the position of his vessel with any degree of accuracy except by the buoys.

On the **WNW.** $\frac{1}{4}$ **W.** course the vessel will approach the shore as close as 3 miles; in a smooth sea the shore along this stretch of the coast can be safely approached as close as 2 miles with a depth of 19 feet.

IV. To Sabine Pass, for deep draft vessels.—From South Pass Light-vessel steer **SW.** by **W.** $\frac{1}{4}$ **W.** until Southwest Pass Lighthouse bears **N.**, distant $4\frac{1}{2}$ miles; then steer **W.** by **S.** for $89\frac{1}{2}$ miles, when Ship Shoal Lighthouse should bear **N.**, distant 10 miles. From this position steer **W.** by **N.** for 75 miles and then **NW.** by **W.** $\frac{3}{4}$ **W.** for 57 miles. Calcasieu Lighthouse should then bear **N.**, distant nearly 9 miles. From this position steer **W.** $\frac{1}{4}$ **S.** for $23\frac{1}{2}$ miles, when the vessel should be 1 mile outside the whistling buoy off Sabine Pass.

Remarks.—After having stood 80 miles on the **W.** by **S.** course from Southwest Pass, soundings should be taken frequently, and if the water shoals to less than 6 fathoms the vessel should be headed to the southward so as to clear the shoal water which makes off some distance to the southward of Ship Shoal. After having stood about 10 miles on the **W.** by **N.** course the water should deepen to 9 fathoms, and this is the least that should be found during the remainder of the time the vessel is on this course.

On the **NW.** by **W.** $\frac{3}{4}$ **W.** course the water shoals gradually and regularly; when Calcasieu Lighthouse bears **N.** the depth should be about 6 fathoms. The **W.** $\frac{1}{4}$ **S.** course leads about midway between the northern edge of Sabine Bank and the shore.

V. To Galveston Entrance, for deep draft vessels.—From South Pass Light-vessel steer **SW.** by **W.** $\frac{1}{4}$ **W.** until Southwest Pass Lighthouse bears **N.**, distant $4\frac{1}{2}$ miles; then steer **W.** by **S.** for $89\frac{1}{2}$ miles, when Ship Shoal Lighthouse should bear **N.**, distant 10 miles. From this position steer **W.** $\frac{1}{4}$ **S.** for 173 miles and then steer **NW.** for about 24 miles, until in about 6 fathoms of water, off the entrance to Galveston Bay.

Or, follow the directions in paragraph IV, preceding, until nearly up to Sabine Pass entrance and then steer about **SW.** by **W.** $\frac{1}{4}$ **W.**, giving the shore a berth of about 5 miles, until off the entrance to Galveston Bay.

Remarks.—Having stood about 80 miles on the **W.** by **S.** course, soundings should be taken frequently, and the vessel headed to the southward if the water shoals to less than 6 fathoms. In a heavy sea the vessel should be kept in 9 fathoms of water.

The **W.** $\frac{1}{4}$ **S.** course leads well to the southward of the $4\frac{1}{2}$ -fathom shoal off Galveston Entrance. (See, also, the remarks under paragraph IV, preceding.)

5. From a position 1 mile E. of the Whistling Buoy off Galveston Entrance.—**I. To the whistling buoy off Brazos River.**—Steer **SW.** $\frac{1}{4}$ **S.** for $39\frac{1}{2}$ miles.

II. To Pass Cavallo Bar buoy.—Steer **SW.** $\frac{1}{4}$ **S.** for $39\frac{1}{2}$ miles; leave Brazos River whistling buoy on the starboard hand and steer **SW.** $\frac{3}{4}$ **W.** for 68 miles; Matagorda Lighthouse should then bear about **W.** by **N.** and the whistling buoy should be nearly in range with it.

III. *To the Outer Bar buoy off Aransas Pass.*—Follow the directions in paragraph II, preceding, until off Pass Cavallo Bar buoy; then steer **SW. $\frac{1}{4}$ S.** for 45 miles, until off the entrance to Aransas Pass.

IV. *To the Outer Sea buoy off Brazos Santiago.*—Follow the directions in paragraphs II and III, preceding; when up to the Outer Bar buoy off Aransas Pass, steer **S. $\frac{3}{4}$ E.** for 106 miles; this course should lead to the Outer Sea buoy off Brazos Santiago.

Remarks.—From a point 12 miles to the southward of Galveston Entrance to the mouth of the Rio Grande the deepest draft vessels can stand along the coast at a distance of 3 miles from the beach. The whistling buoy off Galveston Entrance is not in position during June, July, August, or September. During the summer months the whistling buoy off Brazos River is replaced by a black and white perpendicularly striped can buoy. The lighthouses are the only features along this stretch of the coast that can be easily recognized.

KEY WEST HARBOR.*

This harbor is large and commodious, and one of the best anchorages for large vessels south of Chesapeake Bay. It lies to the northward of a broken line of the Florida Reefs in Latitude **24° 33' N.** and Longitude **81° 49' 30" W.** and is 16 miles to the westward of American Shoal Lighthouse and about 90 miles N. by E. $\frac{1}{4}$ E. from Habana. On the eastern side of the harbor is the city of **Key West**, which has a population of about 20,000 and is of considerable commercial importance. It is the only city of any size on the west and north shores of the Straits of Florida, and has steamship communication with New York, Habana, Tampa, Cedar Keys, New Orleans, and Galveston. A large number of steamers and small sailing vessels enter and clear from the port, over half of which are from or for foreign ports. The greatest draft of vessels coming to the port is 25 feet and the average draft about 14 feet. Key West Harbor, through its Northwest Channel, affords a short route from the Straits of Florida into the Gulf of Mexico for vessels of less than 12 feet draft.

Prominent features.—When standing along about 6 miles to the southward of the Florida Keys, as the entrances from the southward are approached, **Key West Lighthouse** (see table, page 10) will be seen near the western end of Key West Island, and **Fort Taylor**, a brick casemated structure, will show prominently a little to the westward of the island. **Sand Key Lighthouse** (see table, page 10) will be seen about 7 miles to the southwestward from Key West Lighthouse and the former will sometimes have the appearance of a sail. There are two brick Martello towers on the south side of Key West Island to the eastward of the lighthouse; these towers can be seen from some distance outside of the reefs. To the northwestward of the harbor, and marking the entrance to the Northwest Channel, is **Northwest Passage Lighthouse** (see table, page 10). On the western end of Key West Island the **United States Naval Storehouse** and the **Marine Hospital (Lazaretto)**, the latter a large yellow building, will show conspicuously.

Channels.—There are eight different channels, or approaches, to the harbor leading between the reefs and coral banks which surround it. These channels are easy to follow in a sailing vessel in the daytime with a leading wind, but it is not safe for a stranger of more than 14 feet draft to attempt to beat into the harbor.

1. **Southeast Channel** is good for a least depth of 25 feet and is marked by several buoys and at night by a red sector in Key West Light, but the channel is narrow and should not be attempted by a sailing vessel of over 14 feet draft except with a leading wind.

2. **Point of Reef Channel** is good for a least depth of 19 feet and leads from a point $\frac{1}{4}$ mile to the westward of beacon "5," directly for Key West Lighthouse. This channel is not marked, and as there are spots with 14 feet of water over them lying near the channel it is not recommended for vessels over that draft.

3. **Main Ship Channel** is good for a least depth of 30 feet; it is quite narrow in places but well marked by buoys and at night by a red sector in Key West Light. This is the channel commonly used by the deeper draft steamers. A stranger of over 15 feet draft should not attempt to enter by this channel at night.

4. **Rock Key Channel** leads between Sand Key Lighthouse and Rock Key; the channel is not marked and is not safe for vessels of over 15 feet draft.

5. **Sand Key Channel** leads between Sand Key Lighthouse and Western Dry Rocks; it is good in the daytime for vessels of about 18 feet draft. Vessels of less than 14 feet draft can pass through this channel on a straight course for Key West Lighthouse. A stranger should not attempt this channel at night.

6. **Southwest Channel** is convenient for vessels approaching from the southward and westward; it has a least depth of 30 feet if closely followed and is marked by several buoys. Vessels of less than 17 feet draft can make one straight course nearly to the anchorage on a bearing of Key West Lighthouse in the daytime and by standing on the edge of a red sector of that light at night. Vessels of a greater draft than 17 feet should only enter in the daytime, when the buoys can be seen, and, if sailing vessels, they should have a leading wind.

*Shown on charts 109, scale $\frac{1}{30,000}$, price \$0.50; 462, scale $\frac{1}{50,000}$, price \$0.25.

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7. **West Channel** is broad and clear and if marked by buoys would be good for a depth of 30 feet, but it is not now recommended for vessels of over 17 feet draft.

8. **Northwest Channel** is being improved by the United States Government and (1896) has a depth of 12½ feet. This channel affords a short cut from Key West Harbor to the Gulf of Mexico and is well marked by Northwest Passage Lighthouse and several buoys and a beacon.

Anchorage.—The best anchorage is in the Inner, or **Man of War, Harbor**, where the depth is 4 to 4½ fathoms; this anchorage is to the northward of the city between coral banks, which prevent a heavy sea. Vessels can anchor anywhere off the city to the northward of Fort Taylor, or in the entrance to the Northwest Channel abreast of the city in from 3½ to 5 fathoms of water, taking care, however, not to get too close to the reefs, which in some places rise abruptly at the edge of the channels. The outer anchorage, about 1½ miles to the southward and eastward from Fort Taylor, has depths of 4½ to 5½ fathoms and is somewhat exposed, but is safe for vessels with good ground tackle.

Quarantine.—The boarding station is at the yellow buoy above Fort Taylor; no vessel is permitted to pass above this buoy before obtaining pratique. At night vessels must anchor outside the buoy; in the daytime they may heave to until boarded. The quarantine anchorage is in Man of War Harbor to the northward of Fleming Key. (See, also, the quarantine regulations in Appendix I, and National Quarantines in Appendix IV.)

Pilots can always be had by making signal while outside the reefs. Pilot boats are usually cruising outside and a good lookout is kept for approaching vessels. Pilotage is compulsory for certain vessels. (See pilot laws, regulations, and rates in Appendix I.) Pilots for the Hawk Channel can be had at Key West.

Wharves.—The depth of water at the wharves ranges from 10 to 24 feet, according to locality.

Supplies.—A large supply of anthracite and bituminous coal is always kept on hand. Steamers go alongside the wharves and coal is put on board in wheelbarrows. Water can be obtained at the wharves through pipe and hose from cisterns. Provisions and ship chandler's stores can be obtained in the city.

Repairs.—There is a floating sectional dock with a capacity for vessels of 500 to 600 tons. Repairs to the hulls of wooden vessels can be made, but there are no facilities for repairing iron or steel vessels or the machinery of steamers except of the lightest description.

Wind Signals of the United States Weather Bureau are displayed so as to be visible to the shipping in the harbor. (See Appendix II.)

United States Marine Hospital Service.—The Marine Hospital, or Lazaretto, is open to foreign as well as American seamen, but the former must pay \$1 per day. (See Appendix IV.)

Tides.—The rise and fall of mean tides is 1.2 feet (see, also, the table on page 21).

Currents.—The set and velocity of the currents depend much on the Gulf Stream and the prevailing winds, and vary so frequently that no fixed rule can be deduced from observations. Occasionally the ebb and flow run nearly the whole 12 hours. Sometimes the current of a neap tide runs with great velocity while that of a spring tide is scarcely perceptible. The following statements will give an idea of what may be expected at the localities mentioned: At entrance to Main Channel, flood current **N.** by **W.** and ebb **SE.** by **S.**; at entrance to Southeast Channel, flood current **NW.** and ebb **WSW.**; at Triangle buoys, flood current **N.** and ebb **SE.**; at Whitehead Spit buoy, flood current **NW.** and ebb **S.** by **E.**; Outer Harbor, flood current **NNW.** and ebb **SSW.**; Inner Harbor, flood current **NNE.** and ebb **SW.** by **S.**

Winds.—The prevailing winds are easterly; the strongest are **N.** in winter and easterly during the hurricane months.

SAILING DIRECTIONS, ENTERING KEY WEST HARBOR.

The directions for each channel are given in separate sections. (See, also, the descriptions of the channels on page 29). In the following directions allowance must be made for the draft if there is a heavy swell or sea.

1. **Entering by the Southeast Channel.**—In the daytime for vessels of less than 24 feet draft.—Being outside the reefs and with a depth of 15 fathoms, bring Key West Lighthouse to bear **NW. ¼ N.** and steer for it, keeping the lighthouse on the bearing. On this course leave red nun buoys Nos. 2 and 4 about 100 yards on the starboard hand and head directly for Hawk Channel Turn buoy (can, white and black perpendicular stripes). When up to this buoy leave it close to on either hand and steer **W. ¼ N.**; pass to the southward of red buoy No. 6 (see remarks following). Leave this buoy 200 yards on the starboard hand and steer **N.**; on this course black can buoy No. 11 should be left about 150 yards on the port hand, and when it bears abeam steer **NNE.**, leaving red nun buoy No. 8 on the

starboard hand. Anchor about $\frac{1}{4}$ mile to the northward of this buoy in 4 to 5 fathoms of water, or, continue on to the city wharves, which should be given a berth of 100 yards.

At night for vessels of less than 16 feet draft.—While outside the reefs and in the white rays of Sand Key Light, bring Key West Light to bear **NW. $\frac{1}{4}$ N.**, which will be on the edge of a red sector in the light. Steer for Key West Light on this bearing, keeping on the edge of the red sector. When Sand Key Light changes from red to white, haul sharp to port and steer **W. $\frac{1}{4}$ N.** for $2\frac{1}{4}$ miles; Key West Light will then show white and bear **NE. $\frac{1}{4}$ N.**; then change the course to **N. by E. $\frac{1}{4}$ E.** and anchor in 4 to 5 fathoms of water when to the westward of the Lazaretto.

Remarks.—When standing for Key West Lighthouse on the **NW. $\frac{1}{4}$ N.** course, care must be taken to keep close on the bearing as there are a number of shoal spots on both sides of the channel. It is not advisable for vessels of over 21 feet draft to go above red buoy No. 6 without a pilot. Vessels of this draft should anchor to the southeastward of red buoy No. 6 in about 5 fathoms of water. When standing on the **NNE.** course from black buoy No. 11, red buoy No. 8 should be left 150 yards on the starboard hand, and if the vessel is subject to visitation by the health officer she should come to about 150 yards to the westward of the yellow Quarantine buoy. Two black can buoys (Nos. 15 and 17) mark the edge of the channel abreast the city wharves; they should be left on the port hand when standing along the wharves or if bound into Man of War Harbor. When entering at night care must be taken not to foul the buoys.

Dangers.—**Raleigh Rock** is a small rock with 15 $\frac{1}{2}$ feet of water over it lying 1 $\frac{1}{2}$ miles S. from Key West Lighthouse; it is marked by a red and black horizontally striped nun buoy placed a short distance to the northward of the rock.

Whitehead Spit makes off $\frac{1}{2}$ mile from the southwestern point of Key West Island. Its extremity is marked by red buoy No. 6, which lies in 30 feet of water, and which must be left on the starboard hand by vessels entering the harbor.

Middle Ground Shoal lies to the westward of the island of Key West, distant about $\frac{1}{2}$ mile. Its southeastern end forms the western boundary of the harbor and is marked by two buoys—South Middle Ground buoy (black, No. 11), lying in 21 feet of water on the south end of the shoal, and Inner Middle Ground buoy (black, No. 13), lying in 18 feet of water on the northwest side of the harbor. Both these buoys must be left on the port hand by vessels entering the harbor.

Fort Taylor Shoal extends about 200 yards to the westward from Fort Taylor; it is part of the same shoal which extends from Whitehead Spit along the western shore of Key West Island. The edge of the shoal is marked by a buoy (red, No. 8).

Frankford Bank is an extensive shoal lying to the westward of the Inner, or Man of War, Harbor. Its south point is marked by a black buoy (No. 15), which lies in 20 feet of water, and its eastern edge by black buoy No. 17 in 18 feet of water. These buoys must be left on the port hand by vessels entering the Inner Harbor.

1 A. *Entering by the Point of Reef Channel.*—*In the daytime or night for vessels of 14 feet or less draft.*—Keep Sand Key Lighthouse bearing to the westward of **W. $\frac{1}{4}$ S.** until Key West Lighthouse is brought on the bearing of **N. by W. $\frac{1}{4}$ W.** Steer for Key West Lighthouse, keeping it on this bearing until Sand Key Lighthouse bears **SW. $\frac{1}{4}$ W.**, or, at night, when it changes from red to white. Then steer **NW. by W.**; pass 500 yards to the northward of a red and black horizontally striped buoy and 200 yards to the southward of red buoy No. 6, and when Key West Lighthouse bears **NE.**, or the Lazaretto is opened to the westward of Fort Taylor, change the course to **N. by E. $\frac{1}{4}$ E.** Leave black buoy No. 11 on the port hand and red buoy No. 8 on the starboard hand and anchor to the westward of the Quarantine buoy, or stand for the city wharves.

Remarks.—The bearing of Key West Lighthouse, when standing for it, should be kept closely, as there are scattered spots with 10 to 17 feet of water over them on both sides of the channel, which has a width of less than $\frac{1}{2}$ mile. (See, also, the remarks and dangers under section 1, preceding.)

1 B. *Entering by the Main Ship Channel.*—*In the daytime for vessels of less than 26 feet draft.*—When over 1 $\frac{1}{2}$ miles to the eastward of Sand Key Lighthouse keep it bearing to the westward of **W. $\frac{1}{4}$ S.** until Key West Lighthouse is brought to bear **N. $\frac{1}{4}$ W.** Steer for Key West Lighthouse on this bearing until up to the Entrance buoy (nun, white and black perpendicular stripes); leave this buoy close to on either hand and steer **N. $\frac{1}{4}$ W.**, heading midway between Fort Taylor and the western shore of Key West Island. On this course pass midway between buoys Nos. 1 and 2 and buoys Nos. 3 and 4. When about

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$\frac{3}{4}$ mile to the northward of the two latter buoys, and Sand Key Lighthouse bears **SW. South-erly**, change the course to **NW. by N.**, leaving a red and black horizontally striped nun buoy about 500 yards on the starboard hand. Anchor a little over $\frac{1}{4}$ mile to the southward of red buoy No. 6, with Key West Lighthouse bearing about **NNE**.

If of less than 21 feet draft, continue the **NW. by N.** course; leave red buoy No. 6 about 200 yards on the starboard hand, and follow the directions in section 1, preceding.

Remarks.—On the **N. $\frac{1}{4}$ W.** course, Fort Taylor should be a little on the port bow and the western shore of Key West Island on the starboard bow, and when the buoys are made the vessel should head fair between them on this course. The channel is very narrow between buoys Nos. 3 and 4. On the **NW. by N.** course red buoy No. 6 should be on the starboard bow.

If bound to the anchorage off the Lazaretto or to the city wharves, see the remarks and dangers under section 1, preceding.

At night for vessels of less than 15 feet draft.—Keep in the white rays of Sand Key Light until Key West Light bears **N. $\frac{1}{4}$ W.** Steer for Key West Light on this bearing, taking care to keep on the edge of the red sector in the light, and keep a sharp lookout also so as not to foul the buoys. When Sand Key Light changes from red to white and bears **SW. $\frac{1}{4}$ W.**, steer **NW. by N.** until Key West Light changes from white to red. Then change the course to **N. by E. $\frac{1}{4}$ E.** and anchor off the Lazaretto in 4 to 5 fathoms of water.

Remarks.—These directions, while heading for Key West Lighthouse, lead over several spots with 17 feet of water over them. On the **NW. by N.** course red buoy No. 6 is left about 250 yards on the starboard hand, and the vessel will be in the white rays of Key West Light. On the **N. by E. $\frac{1}{4}$ E.** course a red sector in Key West Light will be crossed; a part of the time the light may be obscured by Fort Taylor, and just before the light clears the north end of Fort Taylor black buoy No. 11 should be left 100 yards on the port hand. When the light bears **E. by N.** red buoy No. 8 should be 150 yards on the starboard beam.

1 C. *Entering by the Rock Key Channel.*—*In the daytime for vessels of less than 15 feet draft.*—When a little over $\frac{1}{4}$ mile to the eastward of Sand Key Lighthouse with it bearing to the northward of **W.**, bring Middle Ground beacon "**3**," which is $1\frac{1}{4}$ miles **N. by W.** from the lighthouse, to bear **NNW. $\frac{1}{4}$ W.**; steer for the beacon on this bearing, and, when Sand Key Lighthouse bears **S. $\frac{1}{4}$ W.** and the beacon is $\frac{1}{4}$ mile distant ahead, steer **NNE. $\frac{1}{4}$ E.** heading for the northwest end of Key West Island. Leave Eighteen-foot Shoal buoy (red, No. 8) about 200 yards on the starboard hand and continue on the course to the anchorage off the Lazaretto, taking care to leave the buoys on the side indicated by their color.

Remarks.—There is a spot with 15 feet and several with 17 feet of water over them lying on both sides of the channel, and as they are not marked great care is necessary while standing on the bearing of the beacon and when the course is changed to **NNE. $\frac{1}{4}$ E.**

1 D. *Entering by the Sand Key Channel.*—*In the daytime for vessels of 18 feet or less draft.*—Being to the southwestward of Sand Key Lighthouse, as soon as Western Dry Rocks beacon "**2**" is made bring it to bear **W.**, distant $\frac{3}{4}$ mile. From this position steer **N. by E. $\frac{1}{4}$ E.**, with West Crawfish Key directly ahead. When Key West Lighthouse bears **NE. $\frac{1}{4}$ E.**, steer for it on the bearing until the buoy off Whitehead Spit (red, No. 6) is about 2 points forward of the starboard beam, then haul up to **N. by E. $\frac{1}{4}$ E.** and stand for the anchorage off the Lazaretto, leaving black buoy No. 11 on the port and red buoy No. 8 on the starboard hand.

Remarks.—On the **N. by E. $\frac{1}{4}$ E.** course red buoy No. 4 and a red and black horizontally striped buoy will be left nearly $\frac{1}{4}$ mile on the port hand. West Crawfish Key is the smallest and most southern of the three keys closest to the westward of Key West Island. When standing for the key East Crawfish Key will be open to the eastward and Snipe Key to the westward; both these keys are more distant than West Crawfish Key. A shoal extends $\frac{1}{4}$ mile to the westward from Middle Ground beacon "**3**"; to avoid it the beacon should be left 1 mile or more on the starboard hand. On the **NE. $\frac{1}{4}$ E.** course, with Key West Lighthouse ahead, beacon "**3**" should be $\frac{1}{4}$ mile on the starboard hand when abeam, red buoy No. 6 is left on the starboard hand, and $2\frac{1}{4}$ miles farther on this course black buoy No. 7 is left on the port hand.

In the daytime or at night, with clear weather, for vessels of less than 14 feet draft.—Bring Sand Key Lighthouse to bear **ENE. $\frac{1}{2}$ E.**, distant nearly $1\frac{1}{2}$ miles, and if Key West Lighthouse can be seen (it will be distant a little over 8 miles), steer for Key West Lighthouse, course **NE. $\frac{1}{2}$ N.** Keep the lighthouse close on this bearing until the buoy off Whitehead Spit (red, No. 6) is about $\frac{3}{4}$ mile distant ahead; then steer **N. by E. $\frac{1}{2}$ E.** and stand for the anchorage as directed in the first paragraph of this section.

Remarks.—On the **NE. $\frac{1}{2}$ N.** course for Key West Lighthouse, beacon "3" should be $\frac{1}{2}$ mile distant when on the port beam, and the sailing line passes close to a 15-foot spot and two 17-foot spots. Red buoy No. 2, which is about $\frac{1}{2}$ mile to the northward of Sand Key Lighthouse, should be left nearly $\frac{1}{2}$ mile on the starboard hand, and red buoy No. 8 should be left about 200 yards on the starboard hand when it is passed.

1 E. *Entering by the Southwest Channel.*—*In the daytime to carry a depth of 30 feet.*—As soon as Sand Key Lighthouse is sighted bring it to bear **E. by N.** and steer for it on this bearing. When the lighthouse is $6\frac{1}{4}$ miles distant ahead on this bearing, Vestal Shoal buoy (can, black, No. 1) should be a little over $\frac{1}{2}$ mile on the port beam. Continue on for the lighthouse 1 mile farther, and then steer **NE. $\frac{3}{4}$ E.** Leave Satan Shoal buoy (can, red and black horizontal stripes) about 200 yards on the starboard hand and red buoys Nos. 2 and 4 about 400 yards on the starboard hand. Parsonage Shoal buoy (nun, red and black horizontal stripes), which will be made ahead, should be left 100 yards on the starboard hand while heading for Key West Lighthouse. After passing this buoy continue on the **NE. $\frac{3}{4}$ E.** course with Key West Lighthouse ahead and pass red buoy No. 6, leaving it 500 yards on the starboard hand when abeam. When Middle Ground beacon "3" is in range with Sand Key Lighthouse bearing **S. by E.** steer **NE. by E. $\frac{1}{2}$ E.** for $3\frac{1}{4}$ miles; the East Martello tower should be ahead on this course. Just before the northwestern corner of Fort Taylor comes in range with the Lazaretto steer **NNE. $\frac{1}{4}$ E.** for the Lazaretto, keeping it slightly open to the northward of Fort Taylor.

If over 21 feet draft, when the buoy off Whitehead Spit (red, No. 6) is about $\frac{1}{2}$ mile distant off the starboard bow, haul to the eastward and pass a little over $\frac{1}{2}$ mile to the southward of the buoy; then anchor in 5 fathoms of water.

If less than 21 feet draft continue on the **NNE. $\frac{3}{4}$ E.** course until a **N. by E. $\frac{1}{2}$ E.** course will lead about 150 yards to the eastward of black can buoy No. 11; then steer that course and anchor in 4 to 5 fathoms of water off the Lazaretto.

Remarks.—On the **NE. $\frac{3}{4}$ E.** course two black buoys, marking shoals, will be seen some distance to the northward of the sailing line. There is 19 feet of water on Parsonage Shoal and the buoy, which is placed on the middle of it, can be left on either hand, giving it a berth of 100 yards: it is said that the best water is to the southward of the buoy. There are several 17-foot spots about $\frac{1}{2}$ mile to the westward of Parsonage Shoal buoy. On the **NE. by E. $\frac{1}{2}$ E.** course West Crawfish Key Bank buoy (can, black, No. 7) will be left $\frac{1}{2}$ mile on the port hand. (See, also, the dangers under section 1, on page 31.)

1 F. *Entering by the West Channel.*—*In the daytime for vessels of less than 17 feet draft.*—Passing about $3\frac{1}{4}$ miles south of Marquesas Keys steer **E. $\frac{1}{2}$ N.** so as to pass about 2 miles to the southward of Boca Grande and Man keys. As soon as Entrance to West Channel buoy (can, white and black perpendicular stripes) is made steer for it. Leave this buoy close-to on either hand and steer **ENE. $\frac{3}{4}$ E.** until up to West Crawfish Key Bank buoy (can, black, No. 7). Pass 400 yards to the southward of this buoy, and when it is in range with Northwest Passage Lighthouse on a **NNW.** bearing steer for Key West Lighthouse, course about **NE. $\frac{1}{2}$ E.**, until a **NNE.** course will lead to the eastward of black buoy No. 11 and clear the wharves of the city. Then steer **NNE.** and anchor off the Lazaretto in 4 to 5 fathoms of water.

Remarks.—The Marquesas Keys must be given a berth of at least 3 miles while to the southward of their eastern end. The **E. $\frac{1}{2}$ N.** course should lead about $\frac{1}{2}$ mile to the southward of South buoy (can, white and black perpendicular stripes), which marks the southern entrance of the Boca Grande Channel. When Boca Grande Key, the first key to the eastward of Marquesas Keys, is abeam and about 2 miles distant the Entrance to West Channel buoy should be 2 miles distant ahead. The city of Key West is 9 miles distant in a straight line from this buoy. The **ENE. $\frac{3}{4}$ E.** course leads about $\frac{1}{2}$ mile to the southward of the large shoal which lies between Key West Island and Marquesas Keys. When standing for Key West Lighthouse the red buoy off Whitehead Spit will be made on the starboard bow. (See the dangers under section 1, page 31.)

1 G. *Entering by the Northwest Channel.*—*In the daytime for vessels of less than 12 feet draft.*—When Northwest Passage Lighthouse is about 5 miles distant bring it to bear **S.** and steer for it on this bearing until up to the entrance bell buoy. Turning Point beacon (red piles) will then be in range with Sand Key Lighthouse. Steer for the beacon, keeping it in range with Sand Key Lighthouse, and when the beacon is about 250 yards distant ahead steer **SE. $\frac{1}{2}$ E.** with Key West Lighthouse a very little on the starboard bow. Leave Middle Mid-channel buoy (nun, white and black perpendicular stripes) close-to on either hand and from this buoy steer directly for Key West Lighthouse. Leave black can buoy No. 7 about 150 yards on the port hand and from it steer **SSE. $\frac{1}{2}$ E.**, leaving black can buoy No. 9 about 300 yards on the port hand and heading directly for Inner Mid-channel buoy (nun, white and black perpendicular stripes). Leave the latter buoy close-to on either hand and steer **SE. by E.** so as to pass to the southward of black can buoy No. 13. Passing to the southward of this buoy haul up more to the eastward and anchor, or, stand for the city wharves, leaving black can buoy No. 15 on the port hand.

Remarks.—The range of Turning Point beacon and Sand Key Lighthouse leads through the dredged channel, which has a depth of 12½ feet. The range can only be seen on a clear day; at other times the buoys on both sides of the dredged channel must be the guides. From Turning Point beacon, on the **SE. $\frac{1}{2}$ E.** course, Key West Lighthouse should be nearly ahead and the Middle Mid-channel buoy should be made directly ahead. Above this buoy it is only necessary to keep a sharp lookout for the buoys and leave them on the proper side. A wreck, marked by a red and black horizontally striped buoy, lies on the Middle Ground about $\frac{1}{2}$ mile **SE. by E. $\frac{1}{2}$ E.** from Inner Mid-channel buoy, but this wreck buoy should be left well on the port hand. When standing to pass to the southward of black buoy No. 13, the vessel will cross the southern end of the Middle Ground in about 16 feet of water. (See, also, the dangers under section 1, page 31.)

SAILING DIRECTIONS, LEAVING KEY WEST HARBOR.

These directions are for vessels bound to the westward or into the gulf, each channel being treated in a separate section (see, also, the descriptions of the channels on pages 29, 30). The draft for which these directions are written is intended for comparatively smooth water; allowance must, therefore, be made in case there is a heavy swell on the reefs. No stranger should attempt to beat in or out of Key West Harbor without a pilot.

1. *Leaving by the Main Ship Channel.*—*In the daytime, for vessels of less than 26 feet draft.*—Bring red buoy No. 6, off Whitehead Spit, to bear **NE.**, distant 300 yards, and steer **SE. by S.** for 1½ miles, leaving a red and black horizontally striped nun buoy about 500 yards on the port hand; then change course to **S. $\frac{1}{2}$ E.**, heading so as to pass midway between buoys Nos. 3 and 4 and midway between buoys Nos. 1 and 2. Continue the course, heading directly for the Entrance buoy, which should be left close-to, and when $\frac{1}{2}$ mile to the southward of this buoy steer **SW. by W. $\frac{1}{2}$ W.** until Sand Key Lighthouse bears **N. by W.** and is distant 1½ miles; then—

*If desiring to enter the Gulf to the westward of Rebecca Shoal, make good a **W. $\frac{1}{2}$ S.** course for 35 miles and then a **NW. $\frac{1}{4}$ N.** course for 11 miles; this will lead to a point about 2 miles **W.** from Rebecca Shoal Lighthouse (see table, page 10).*

*If desiring to enter the Gulf to the westward of Dry Tortugas, make good a **W. $\frac{1}{2}$ S.** course for 35 miles and then a **WNW. $\frac{1}{4}$ W.** course for 24½ miles; Dry Tortugas Lighthouse will then bear **N. $\frac{1}{2}$ E.**, distant nearly 5 miles. From this position steer **NW. $\frac{1}{2}$ N.** for 6½ miles; Dry Tortugas Lighthouse will then bear **E.**, distant 4 miles.*

Remarks.—In the daytime, with clear weather, no difficulty should be experienced in carrying a depth of 30 feet through this channel. When standing on the **S. $\frac{1}{2}$ E.** course the vessel should head fair between buoys Nos. 3 and 4 and the stern should point about midway in the opening between Fort Taylor and the western water front of the city of Key West.

The **W. $\frac{1}{2}$ S.** course leads a little over 1 mile outside the 5-fathom curve which extends along the reefs to the westward of Vestal Shoal.

1 A. *Leaving by the Rock Key Channel.*—*In the daytime, for vessels of less than 15 feet draft.*—From black buoy No. 11, in the harbor, steer **SSW. $\frac{1}{4}$ W.**, keeping the ends of the wharves at the northwestern part of Key West over the stern. Leave red nun buoy No. 8 about 200 yards on the port hand and continue the course until Middle

Ground beacon "3," which is $1\frac{1}{2}$ miles **N.** by **W.** from Sand Key Lighthouse, bears **NNW.** $\frac{1}{2}$ **W.**; then steer **SSE.** $\frac{1}{2}$ **E.** with beacon "3" over the stern, and when the lighthouse bears **W.** steer about **S.** $\frac{1}{2}$ **W.** until the lighthouse bears **N.** by **W.** and is distant about $1\frac{1}{2}$ miles.

Then, *if bound to the westward into the Gulf*, follow the directions in either of the last two paragraphs in section 1, preceding.

Remarks.—There are a number of unmarked spots near the sailing line with 15 to 17 feet of water over them, and the directions must be closely followed to avoid them (see, also, the remarks for the **W.** $\frac{1}{4}$ **S.** course in section 1, preceding).

1 B. *Leaving by the Sand Key Channel.*—*In the daytime, for vessels of 18 feet or less draft.*—Bring Key West Lighthouse to bear **NE.** $\frac{3}{4}$ **E.** and steer **SW.** $\frac{3}{4}$ **W.**, keeping the lighthouse on the bearing astern. When Sand Key Lighthouse bears abeam, steer **S.** by **W.** $\frac{1}{4}$ **W.** with West Crawfish Key directly astern; pass a little over $\frac{1}{2}$ mile to the eastward of beacon No. 2. Bring the beacon to bear **N.**, distant $1\frac{1}{2}$ miles, and follow the directions in either of the last two paragraphs in section 1, preceding, but the **W.** $\frac{1}{4}$ **S.** course should be made good only for a distance of 32 miles.

Or, *vessels of less than 14 feet draft* can bring Key West Lighthouse to bear **NE.** $\frac{1}{2}$ **N.** and steer **SW.** $\frac{1}{2}$ **S.**, keeping the bearing close over the stern, and leaving red buoy No. 8 about 150 yards on the port hand and beacon No. 3 about $\frac{1}{2}$ mile on the starboard hand. Beacon No. 2 should be left a little over $\frac{3}{4}$ mile distant when on the starboard beam. When this beacon bears **N.**, distant about $1\frac{1}{2}$ miles, follow the directions in either of the last two paragraphs in section 1, preceding, but the **W.** $\frac{1}{4}$ **S.** course should be made good for a distance of only 32 miles instead of 35 miles.

Remarks.—On the **SW.** $\frac{1}{4}$ **W.** course, with Key West Lighthouse astern, black can buoy No. 7 should be left $\frac{1}{2}$ mile on the starboard hand and red can buoy No. 6 about $\frac{1}{2}$ mile on the port hand; the red and black horizontally striped nun buoy on Parsonage Shoal should be about $\frac{3}{4}$ mile distant ahead just before the course is changed to **S.** by **W.** $\frac{1}{4}$ **W.** (See, also, remarks under section 1D, page 32.) On the latter course red nun buoy No. 4 and beacon No. 2 are left about $\frac{1}{2}$ mile on the starboard hand when they bear abeam.

On the **SW.** $\frac{1}{2}$ **S.** course, with Key West Lighthouse astern, the sailing line passes over some spots with 17 feet over them and close to a 15-foot spot which lies 800 yards **SSE.** $\frac{1}{2}$ **E.** from beacon No. 3. Red buoy No. 2, which lies about 800 yards **N.** by **W.** $\frac{1}{4}$ **W.** from Sand Key Lighthouse, will be left nearly $\frac{1}{2}$ mile on the port hand when abeam.

1 C. *Leaving by the Southwest Channel.*—*In the daytime, with clear weather, to carry a depth of 30 feet.*—When near red buoy No. 6, off Whitehead Spit, bring Sand Key Lighthouse to bear **SSW.** $\frac{3}{4}$ **W.** and steer for the lighthouse on this bearing till nearly $1\frac{1}{2}$ miles distant from the buoy; then shape a course **SW.** $\frac{1}{2}$ **W.** with the East Martello tower over the stern. When beacon No. 3 is in range with Sand Key Lighthouse, and red can buoy No. 6 is 700 yards distant, forward of the port beam, steer **SW.** $\frac{5}{8}$ **W.** with Key West Lighthouse astern. Leave Parsonage Shoal buoy 100 yards on the port hand and red nun buoys Nos. 4 and 2 about 400 yards on the port hand. The red and black horizontally striped can buoy on Satan Shoal will be made on the port bow, and, when passing, it should be left over 200 yards on the port hand. Continue the course 2 miles after passing the latter buoy; the black can buoy on Vestal Shoal will then bear **N.**, distant 1 mile. From this position follow the directions in either of the last two paragraphs in section 1, preceding, but the **W.** $\frac{1}{4}$ **S.** course should be made good only for a distance of $28\frac{1}{2}$ miles.

Or, *to carry a least depth of 24 feet*, bring Key West Lighthouse to bear **NE.** $\frac{3}{4}$ **E.** over the stern and steer **SW.** $\frac{3}{4}$ **W.**, taking care to keep the bearing. Leave black can buoy No. 7 on the starboard hand, distant $\frac{1}{2}$ mile, and red can buoy No. 6 on the port hand, distant $\frac{1}{2}$ mile. Parsonage Shoal buoy should be made ahead and left 100 yards on the port hand while passing. Continue the course, leaving the buoys as directed in the preceding paragraph, and when Vestal Shoal buoy bears **N.**, distant 1 mile, follow the directions in either of the last two paragraphs in section 1, preceding, but the **W.** $\frac{1}{4}$ **S.** course should be made good only for a distance of $28\frac{1}{2}$ miles.

Remarks.—Clear weather and daylight are necessary to carry a depth of 30 feet through this channel; there are several 17-foot spots to the northward of, and close to, the sailing line near Parsonage Shoal. The

directions must be followed closely and care taken to pass the buoys at the given distances; unless the conditions are favorable it can hardly be expected that Key West Lighthouse will be seen after passing Parsonage Shoal, or even as far as this.

1 D. *Leaving by the West Channel.*—In the daytime, for vessels of less than 17 feet draft.—From black buoy No. 11 steer **SW.**; pass 400 yards to the southward of black can buoy No. 7 and, when this buoy is in range with Northwest Passage Lighthouse, steer **WSW. $\frac{3}{4}$ W.**; this course continued for $5\frac{1}{4}$ miles will lead to the white and black perpendicularly striped can buoy marking the entrance to West Channel; then—

If desiring to enter the Gulf near Rebecca Shoal, make good a **W. $\frac{1}{4}$ S.** course for $29\frac{1}{4}$ miles; then steer **NNW. $\frac{1}{4}$ W.** for 5 miles. Rebecca Shoal Lighthouse will then bear **W.**, distant about $2\frac{1}{4}$ miles. Or, after having made good the **W. $\frac{1}{4}$ S.** course for $29\frac{1}{4}$ miles, steer **NW.** by **W.** for $8\frac{1}{4}$ miles; Rebecca Shoal Lighthouse will then bear **E.**, distant about 2 miles. The passage to the eastward of the shoal is not recommended.

If desiring to enter the Gulf to the westward of Dry Tortugas, make good a **W. $\frac{1}{4}$ S.** course for $29\frac{1}{4}$ miles; then make good a **W. $\frac{3}{4}$ N.** course for $23\frac{1}{4}$ miles; Dry Tortugas Lighthouse will then bear **N. $\frac{1}{4}$ E.**, distant nearly 5 miles. From this position steer **NW. $\frac{1}{2}$ N.** for $6\frac{1}{4}$ miles; the lighthouse will then bear **E.**, distant 4 miles.

Or, if desiring to pass close to Dry Tortugas, after having made good the **W. $\frac{1}{4}$ S.** course for $29\frac{1}{4}$ miles, make good a **W. $\frac{3}{4}$ N.** course for $25\frac{1}{4}$ miles; Dry Tortugas Lighthouse should then bear **NE.** by **N.** and be distant about $3\frac{3}{4}$ miles. From this position steer **NW. $\frac{1}{2}$ N.** for $3\frac{3}{4}$ miles; the lighthouse will then bear **E.**, distant 4 miles.

Remarks.—Standing on the **W. $\frac{1}{4}$ S.** course, and when about $6\frac{1}{4}$ miles to the westward of the buoy marking the entrance to West Channel, the black and white perpendicularly striped can buoy marking the entrance to Boca Grande Channel should be left $\frac{1}{4}$ mile on the starboard hand. The sailing line leads 2 to $2\frac{1}{2}$ miles to the northward of the buoys marking Coalbin and Marquesas rocks. Having made good the **W. $\frac{1}{4}$ S.** course for $29\frac{1}{4}$ miles, Rebecca Shoal Lighthouse should bear **NW.** and be $6\frac{1}{4}$ miles distant. The lighthouse may be approached as close as $\frac{3}{4}$ mile with 6 fathoms of water from any direction, but care must be taken to avoid Isaac Shoal. A red sector in Rebecca Shoal Light covers the shoals to the southward and eastward of Halfmoon Shoal.

The **W. $\frac{3}{4}$ N.** course leads well to the southward of Dry Tortugas, but the **W. $\frac{1}{4}$ N.** course leads only $\frac{1}{4}$ mile to the southward of the southernmost shoals and the large red nun buoy marking them.

The **NW. $\frac{1}{2}$ N.** course leads $\frac{3}{4}$ mile to the westward of the westernmost shoals and the large red can buoy which marks them.

Dangers.—An unbroken line of reefs and shoals extends for a distance of 36 miles in a **W.** direction from Key West. Boca Grande Channel, which has a depth of 11 feet, is the only buoyed channel which leads across these shoals into the gulf. The western part of this line of shoals is known as The Quicksands and its extreme western end as Halfmoon Shoal; this last has a least depth of 6 feet and is marked off its western end by a red can buoy marked "Halfmoon."

Isaac Shoal, a small 14-foot spot, lies $1\frac{1}{2}$ miles **SE.** by **E. $\frac{1}{4}$ E.** from Rebecca Shoal Lighthouse. This shoal is not marked except by the southerly edge of the red sector in Rebecca Shoal Light, which cuts its southern edge, and vessels entering or passing out of the gulf to the eastward of Rebecca Shoal should be careful to avoid it.

Rebecca Shoal extends $\frac{1}{4}$ mile in a northerly and northwesterly direction and nearly $\frac{3}{4}$ mile in an easterly direction from the lighthouse.

For the shoals of the Dry Tortugas, see heading Dry Tortugas.

1 E. *Leaving by the Northwest Channel.*—In the daytime, for vessels of less than 12 feet draft.—From black can buoy No. 13 steer **NW.** by **W. $\frac{1}{4}$ W.** for $1\frac{1}{4}$ miles, heading directly for the Inner Mid-channel buoy (black and white perpendicular stripes). Passing close to the westward of this buoy steer **NW.** by **N.** for $1\frac{1}{4}$ miles, leaving black can buoy No. 9 about $\frac{1}{4}$ mile on the starboard hand; when up to black can buoy No. 7, which must be left on the starboard hand, change course to **NW. $\frac{1}{4}$ W.**, heading for Middle Mid-channel buoy (black and white perpendicular stripes). Run this course for $1\frac{1}{2}$ miles, and when up to the buoy steer **NW. $\frac{3}{4}$ W.** for a little over $1\frac{1}{2}$ miles, heading fairly between Turning Point beacon and black can buoy No. 5. When this buoy is abeam change course to **N. $\frac{1}{4}$ W.**, heading for the bell buoy marking the entrance. This course lies about midway between the black can buoys Nos. 3 and 1, on the starboard hand, and the red nun buoys Nos. 4 and 2, on the port hand.

Remarks.—A wreck, marked by a red and black horizontally striped buoy, lies on the Middle Ground about $\frac{1}{2}$ mile SE. by E. $\frac{1}{4}$ E. from Inner Mid-channel buoy, and this wreck buoy should be left well on the starboard hand when on the NW. by W. $\frac{1}{4}$ W. course. Between black can buoy No. 7 and Turning Point beacon, Key West Lighthouse should be very nearly astern. The range of Turning Point beacon and Sand Key Lighthouse leads through the dredged channel, which has a depth of $12\frac{1}{2}$ feet. The range can be seen only on a clear day; at other times the buoys on both sides of the dredged channel must be the guides.

Dangers.—Middle Ground Shoal lies to the westward of the Island of Key West, distant about $\frac{1}{2}$ mile. Its southeastern end forms the western boundary of the harbor. It is marked by three buoys: Inner Middle Ground buoy (black, No. 13), marking the passage through the Middle Ground; Middle Ground buoy (black, No. 9), on the western edge of shoal; and Northwest Middle Ground buoy (black, No. 7), in 21 feet of water, marking the northwestern end of shoal. These buoys must be left on the starboard hand.

THE DRY TORTUGAS.*

This is a group of reefs and keys about 11 miles long, in a general NE. by E. and SW. by W. direction, and about 5 miles wide, lying 58 miles W. from Key West. The eastern end of this group is 12 miles to the northward of Rebecca Shoal Lighthouse: in general they rise abruptly from deep water and are irregular in form, with channels between them. The keys, only eight of which now show above high water, are low, but Fort Jefferson and Tortugas Harbor Lighthouse, on Garden Key, and Dry Tortugas Lighthouse (see table, page 10), on Loggerhead Key, form good landmarks which can be seen at a distance of 10 to 12 miles on a clear day and 13 to 18 miles on a clear night.

Tortugas Bank, which has a least depth of $6\frac{1}{2}$ fathoms over it, lies $7\frac{1}{2}$ miles to the westward from Dry Tortugas Lighthouse. This bank has a diameter of about $2\frac{1}{2}$ miles, and on it there are spots with less than 8 fathoms of water, but between it and the Dry Tortugas the depth ranges from 10 to 19 fathoms.

Prominent features.—Fort Jefferson is a large brick fort on Garden Key and $2\frac{1}{2}$ miles E. from Dry Tortugas Lighthouse; just inside of the southeastern angle of the fort is Tortugas Harbor Lighthouse; this, together with the fort, has the appearance of a bare rocky island when seen from a distance. Loggerhead Key is the largest and westernmost of the keys and is marked by Dry Tortugas Lighthouse. East Key is the easternmost of the group and lies 4 miles NE. by E. $\frac{1}{4}$ E. from Fort Jefferson; this key shows well when approaching from the eastward. Bird Key is a small key lying $\frac{1}{2}$ mile SW. by W. from Fort Jefferson; the buildings of the National Quarantine Station are on this key. The other keys of the group are small and not readily distinguished from a distance.

When approaching Dry Tortugas from the eastward or southeastward the lead will be of but little use to give warning of danger, 10 fathoms being, in many places, found close to the reefs. Approaching from the northward or southwestward the water shoals more gradually, but in thick weather a depth of 10 fathoms is as close as any vessel should approach unless sure of her position.

Channels.—There are four buoyed channels leading into the anchorage.

1. **Southeast Channel** leads between the reefs making off from Garden and Bush keys to the eastward and those making off from East, Middle, and Hospital keys to the westward. A least depth of 7 fathoms can be taken through this channel, and in the daytime, with clear weather, no difficulty is experienced by deep draft vessels, as the reefs are all clearly marked by discolored water and the principal dangers by buoys.

2. **Southwest Channel** leads between the reefs making off to the southwestward and westward from Garden and Bird keys and those extending to the southwestward from Loggerhead Key. This channel has a least depth of about 8 fathoms, and near its narrowest part is marked by two buoys.

3. **Northwest Channel** leads between the detached reefs which lie to the northward of Garden Key; it is good for a depth of about $7\frac{1}{2}$ fathoms, and is marked at its northern entrance by a buoy which is $4\frac{1}{2}$ miles distant from Fort Jefferson.

4. **New Northwest Channel** is just to the westward of the Northwest Channel and separated from the latter by a number of reefs and shoals. It is marked by a number of buoys and is good for a depth of $6\frac{1}{2}$ fathoms. The Entrance buoy for this channel bears N. by W. $\frac{1}{4}$ W., distant $4\frac{1}{2}$ miles, from Tortugas Harbor Lighthouse.

Anchorage.—There are numerous places among the reefs where vessels may anchor and find shelter from winds from different quarters, according to circumstances. The anchorage affording best shelter from all winds, although somewhat open to the northward, is to the northward and northwestward of Garden Key; it has good holding ground and the depth ranges from 8 to 10 fathoms. This anchorage is reached from three different directions through buoyed channels which can be easily followed in the daytime in clear weather, but should never be attempted by a stranger at night.

Excellent anchorage for small vessels and boats is found in the deep water known as Bird Key Harbor, just to the eastward of Bird Key; also in what is known as Tortugas Harbor, the narrow channel through the reefs

* Shown on charts 171, scale $\frac{1}{80,000}$, price \$0.50; 471a, scale $\frac{1}{40,000}$, price \$0.50.

that surround Garden Key and which leads to the wharf at Fort Jefferson. These two anchorages are entered from the northward and are used principally by the fishermen who frequent these waters, in which there is an abundance of fish. ~~The quarantine anchorage is to the northward of Garden Key and is indicated by two yellow buoys.~~

Quarantine.—The National Quarantine Station is on Bird Key, the quarters of the quarantine officers being on Garden Key. (See National Quarantines, Appendix IV.)

Pilots.—Vessels desiring pilots will usually find some competent fisherman near the reefs, or, one of the light keepers will come out to take a vessel to the anchorage.

Tides and currents.—See table, page 21, and remarks, page 23.

SAILING DIRECTIONS, TORTUGAS ANCHORAGE.

The directions in sections 1, 1 A, and 1 B, are good for the deepest draft vessels to an anchorage about $\frac{3}{4}$ mile to the northwestward of Fort Jefferson. The directions in 1 C should not be attempted by vessels of over 17 feet draft. The directions in section 2 are good for small vessels of less than 14 feet draft and lead to the anchorage in Tortugas Harbor. Strangers should not attempt to enter at night.

1. Entering by the Southeast Channel.—*I. From the Eastward.*—When Tortugas Harbor Lighthouse is made bring it to bear **W.** by **N.** and steer for it on this bearing until it is $2\frac{1}{4}$ miles distant ahead, and red nun buoy No. 2 is on the starboard beam, distant about 600 yards; then steer **NW.** $\frac{3}{4}$ **W.** and leave black can buoy No. 3 about 200 yards on the port hand and red buoy No. 4 well on the starboard hand. When black buoy No. 3 bears on the port quarter steer **WSW.** $\frac{3}{4}$ **W.**, heading for Dry Tortugas Lighthouse, for about $\frac{3}{4}$ mile, and, when Bird Key (the small key $\frac{3}{4}$ mile to the southwestward of Fort Jefferson) bears about **S.**, anchor in about 10 fathoms of water.

Remarks.—The **W.** by **N.** course leads well to the southward of the shoals on the eastern side of the channel. On a clear day the shoals can be readily distinguished by the discolored water.

On the **NW.** $\frac{3}{4}$ **W.** course black can buoy No. 3 should be made a little on the port bow; the shoals on the western side of the channel, extending nearly 3 miles to the southward from the buoy, rise abruptly from deep water, and are marked by discolored water. The channel, with a greater depth than 30 feet, is about $\frac{1}{4}$ mile wide between black buoy No. 3 and red buoy No. 4, the better water being on the side of the black buoy.

The **WSW.** $\frac{3}{4}$ **W.** course heads for Dry Tortugas Lighthouse and leads about 300 yards to the northward of black can buoy No. 3 and about 700 yards to the southward of the red and black horizontally striped nun buoy on the Middle Ground; black can buoy No. 5 will be left about 700 yards on the port hand. The two yellow buoys which mark the quarantine anchorage should be left on the port hand, the first one close to and the second about 500 yards distant. A detailed description of all the shoals would only be confusing to the navigator; while following the directions in clear weather the shoals closest to the sailing lines can be located and avoided by the discolored water over them.

II. From the Southward.—While still over 3 miles to the southward of Tortugas Harbor Lighthouse bring it to bear **N.** by **W.** and steer for it on this bearing until black can buoy No. 1 is made and is $\frac{1}{4}$ mile distant; then steer **N.** by **E.** $\frac{1}{4}$ **E.**, leaving this buoy $\frac{1}{4}$ mile on the port hand. Continue this course until Dry Tortugas Lighthouse (on Loggerhead Key) just begins to show to the northward of Fort Jefferson; then steer **NNW.** $\frac{3}{4}$ **W.**. Leave black can buoy No. 3 about 300 yards on the port hand, and when Dry Tortugas Lighthouse bears **WSW.** $\frac{3}{4}$ **W.** steer for it on this bearing; anchor when Bird Key bears **S.**

Remarks.—Steering for Tortugas Harbor Lighthouse on the **N.** by **W.** course black can buoy No. 1 will be made a little on the port bow; a large red nun buoy lying $1\frac{1}{4}$ miles **WSW.** $\frac{3}{4}$ **W.** from the black can buoy may possibly be seen nearly off the port beam.

On the **N.** by **E.** $\frac{1}{4}$ **E.** course the edge of the shoals which lie to the eastward and southward of Fort Jefferson will be clearly defined, but the sailing line in no case comes closer to them than $\frac{1}{4}$ mile. (See, also, the remarks under paragraph I, preceding.)

1 A. Entering by the Southwest Channel.—*From the Southward or Westward.*—From the southward, while Dry Tortugas Lighthouse is still over 5 miles distant, bring it to bear **N.** by **E.** $\frac{1}{4}$ **E.** and steer for it. From the westward, while Tortugas Harbor Lighthouse is still over 5 miles distant, bring it to bear **NE.** by **E.** $\frac{1}{4}$ **E.** and steer for it.

While steering for one lighthouse on either of the above courses watch the bearing of the other lighthouse, and when it bears four points on the bow change course to **NE. $\frac{3}{4}$ N.**; this course should lead fair for the Channel buoy, which should be left close-to on either hand. Continue the **NE. $\frac{3}{4}$ N.** course, leaving black can buoy No. 1 on the port hand, until the hospital on Bird Key bears abeam; then steer **NE.** by **E. $\frac{1}{2}$ E.**; when Bird Key bears **S.** anchor in about 10 fathoms of water.

Remarks.—Vessels of over 20 feet draft should follow the sailing lines closely, and special care should be taken before coming to the Channel buoy not to approach too closely the shoals on the west side of the channel. The narrowest part of the channel is abreast black buoy No. 1, where it is only $\frac{1}{4}$ mile wide.

Depths of 5 to 6 fathoms are found 5 miles **SW.** by **S.** from Tortugas Harbor Lighthouse and about 2 miles outside of Tortugas Sea buoy; to the northward of the latter the shoals are clearly defined by discolored water. Shoals with a greatest depth of 10 feet extend for $2\frac{1}{2}$ miles **SW.** by **W.** from Dry Tortugas Lighthouse; a little over $\frac{1}{4}$ mile outside of these shoals is Loggerhead Reef buoy. On the **NE. $\frac{1}{4}$ N.** course, when close to the Channel buoy (nun, white and black perpendicular stripes), the edge of the shoal to the eastward, which has 5 to 8 feet of water over it, will be seen; this shoal is steep-to on its northern end, where the channel is narrowest, and can be approached within 100 yards.

1 B. *Entering by the New Northwest Channel.*—When 6 miles to the northward of Tortugas Harbor Lighthouse, bring it to bear **S.** by **E. $\frac{1}{4}$ E.** and steer for it on this bearing. When up to the Entrance buoy (can, white and black perpendicular stripes) leave it close-to on either hand and steer **SE.** by **S.** Leave red nun buoy No. 2 about 400 yards on the starboard hand, black can buoy No. 1 about 400 yards on the port hand, and red nun buoy No. 4 about 400 yards on the starboard hand. When abreast of the latter buoy, and the hospital on Bird Key bears **S.**, steer for the hospital on this bearing, leaving the buoys on the hand designated by their color. When Dry Tortugas Lighthouse bears about **W.** by **S.** anchor in about 10 fathoms of water.

Remarks.—The principal shoals on both sides of this channel are marked by buoys; as buoys do not retain their color long in this locality, the shape of a buoy is its most easily distinguished feature. The buoys to be left on the starboard hand when entering are nun-shaped, those on the port hand can-shaped. The Entrance buoy is a large can. On the **SE.** by **S.** course Sand Key, a small low islet, will be on the port bow. Bird Key, which lies to the southwestward of Fort Jefferson, will easily be distinguished by the hospital building on it. On a clear day the shoals on both sides of the channel may be readily seen and avoided.

1 C. *Entering by the Northwest Channel.*—While still more than 6 miles to the northward of Tortugas Harbor Lighthouse bring it to bear **S. $\frac{1}{4}$ E.** and steer for it on this bearing. Keep a sharp lookout ahead for the white and black perpendicularly striped nun buoy marking the entrance, and when the buoy is made steer for it; pass close to the buoy on either side and steer **SE.** for $2\frac{1}{2}$ miles; when Tortugas Harbor Lighthouse bears **S.** by **W. $\frac{1}{4}$ W.** steer for the lighthouse on this bearing. Leave the red and black horizontally striped nun buoy, on the Middle Ground, a little over $\frac{1}{4}$ mile on the starboard hand, and when this buoy is well on the quarter and Dry Tortugas Lighthouse bears **WSW. $\frac{1}{4}$ W.** steer for the latter on this bearing. When the hospital on Bird Key bears **S.** anchor in about 9 fathoms of water.

Remarks.—The entrance buoy should be made ahead on the **S. $\frac{1}{4}$ E.** course; on a clear day the shoals will show discolored water. The course leads about midway between two shoal spots having 13 and 15 feet of water on them respectively.

On the **SE.** course Middle Key, a low, bare islet, will be a little on the port bow.

The **S.** by **W. $\frac{1}{4}$ W.** course leads between shoals which will be left a little over $\frac{1}{4}$ mile on either side of the sailing line. Middle Ground buoy (red and black horizontal stripes) will be left on the starboard hand and black can buoy No. 3 will be made on the port bow; the channel, with a depth of over 5 fathoms, is nearly $\frac{1}{4}$ mile wide between the buoys.

On the **WSW. $\frac{1}{4}$ W.** course the edge of the shoals and black can buoy No. 5 will be left about $\frac{1}{4}$ mile on the port hand; these shoals rise abruptly from deep water and their edges can be closely approached.

2. *To an Anchorage in Tortugas Harbor.*—Having followed the directions in either section 1, 1 A, 1 B, or 1 C, bring Tortugas Harbor Lighthouse to bear **S.** by **E. $\frac{1}{4}$ E.**, distant about $\frac{3}{4}$ mile; then steer for the lighthouse; pass 30 to 40 yards to the westward of black can buoy No. 5, and follow the edge of the shoals on the port hand until Tortugas

Harbor Lighthouse bears about **N.** by **W.**; then anchor about 150 yards to the southward of the wharf in $3\frac{1}{2}$ fathoms of water.

Or, from the anchorage to the northwestward of Tortugas Harbor Lighthouse, steer about **SE.** by **S.**, heading for the red and black horizontally striped nun buoy on Eight-foot Shoal. Leave this buoy about 75 to 100 yards on the starboard hand and follow the edge of the shoal on the port hand, which will show, giving it a berth of 30 to 40 yards. Anchor as directed in the preceding paragraph.

Remarks.—Tortugas Harbor.—The slue separating Garden Key from the shoals to the eastward, southward, and southwestward, is only 70 yards wide in some places, but is distinctly marked in clear weather by the shoals on both sides, which have from 1 to 8 feet of water over them. A vessel entering the harbor must be guided entirely by the eye. In entering either from the northward or the westward the edge of the shoals on the port hand should be followed, and in leaving the anchorage the edge of the shoals on the vessel's starboard hand should be followed. About 250 yards to the southward of black buoy No. 5 and nearly in the middle of the channel is a small $15\frac{1}{2}$ -foot spot.

FLORIDA BAY *

is the large, shallow body of water lying between the south coast of the mainland of Florida and the Florida Keys and extending, in an **E.** and **W.** direction, from Cape Sable to Barnes Sound. The eastern and greater part of this bay is full of ridges and reefs which show bare, or nearly bare, and there are also a large number of small wooded keys; this part is only navigable for small flat-bottomed craft. The western part is comparatively clear, the depth of water ranging from 7 to 13 feet, and vessels of 7 feet draft, bound to the Gulf of Mexico from the Hawk Channel, can enter the Bay of Florida through Moser Channel instead of passing through Key West Harbor, and thus shorten the distances to Cape Romano and Cape Sable by about 45 and 70 miles respectively; but the passage through Moser Channel requires some local knowledge, as there are no aids to assist a stranger. The bay is only frequented by spongers, fishermen, and the inhabitants of the keys, who generally use flat-bottomed craft of 3 to 4 feet draft. There are no towns or villages on the shores of the bay.

COAST FROM CAPE SABLE TO CAPE ROMANO.†

Cape Sable, the southwestern point of the mainland of Florida, is low and wooded, and has three points known respectively as East Cape, Middle Cape, and Northwest Cape. From the latter cape the shore trends about **N.** for 25 miles and then about **NW.** for 26 miles to Cape Romano, and for the greater part of this distance is broken by innumerable low islands and keys between which a network of rivers and bayous lead to the interior. To a stranger the shore presents no features by which to verify his position, the islands and keys being generally wooded and similar in appearance. The only settlement on this stretch of the coast is the post village of Chokoloskee, which is about 2 miles up a bayou the entrance to which is $15\frac{1}{2}$ miles to the southeastward of Cape Romano. For a distance of 10 miles from the shore the water is shoal; $2\frac{1}{2}$ miles from shore the depth is about 7 feet. The best depths that can be taken into any of the rivers and bayous are from 5 to 7 feet, but this part of the coast is visited only occasionally by small craft from Key West and Marco; these vessels seek shelter from gales by entering the rivers or bayous, or, they run inshore as close as their draft will permit and anchor where they find soft bottom.

Shark River empties into the gulf from the southeastward; its entrance, which is about 7 miles to the northward of Northwest Cape, is obstructed by shoals through which a channel with a depth of 7 feet leads into the river, where there is good anchorage for small vessels.

Cape Romano is the southern point of a large island which lies 40 miles **SSE.** $\frac{1}{2}$ **E.** from Sanibel Island Lighthouse and 75 miles **N.** $\frac{1}{2}$ **E.** from Northwest Passage Lighthouse; here the coast changes its trend from **NW.** by **W.** to **NNW.** To the northward of Cape Romano the deep water approaches the shore much more closely than it does to the southward.

Cape Romano Shoals extend 10 miles in a general southerly direction from the cape; they consist of a number of irregular patches with 2 to 11 feet of water over them. These shoals are marked by a large red can buoy ("Cape Romano," in large white letters) moored off their southern end in about 4 fathoms of water.

Cape Romano Anchorage is to the eastward of Cape Romano and affords a good anchorage in 12 feet of water; vessels of less draft can stand well up to the southeastward of the cape and anchor in 7 to 8 feet of water.

* Shown in parts on charts 167, 168, scale $\frac{1}{80,000}$, price of each \$0.50.

† Shown on charts 172, 173, scale $\frac{1}{80,000}$, price of each \$0.50.

CAXIMBA PASS *

is about 4 miles to the southward of Big Marco Pass; it extends in a general E. and W. direction and is about 4 miles long. The western entrance is about 3 miles to the southward of Big Marco Pass entrance and is obstructed by a bar, over which the channel depth is about 5 feet; this channel is not marked, and a stranger should not attempt to enter; local knowledge is necessary to keep in the channel. The pass is of little importance and used only by small local craft.

Persons acquainted with Caximba Pass can be found outside the pass, at Key West, or at Punta Rasa.

BIG MARCO PASS †

is 80 miles N. $\frac{1}{2}$ E. from Northwest Passage Lighthouse, 33 miles SSE. $\frac{3}{4}$ E. from Sanibel Island Lighthouse, and about $7\frac{1}{2}$ miles NW. $\frac{1}{4}$ N. from the southern point of Cape Romano. It is the approach to the port village of Marco, and is about 10 miles long with a narrow and crooked channel in which the depths range from 4 to 30 feet. The northern entrance is obstructed by a bar over which there is a well-buoyed but narrow channel with a least depth of $6\frac{1}{2}$ feet; this is the entrance used by all except small local craft. The southern entrance bears about NE. from the south point of Cape Romano; it is obstructed by a bar with a depth of about 4 feet and, not being marked, is difficult for a stranger to find and enter.

The pass is of little importance; a few spongers and small schooners carrying produce occasionally enter for an anchorage. The village of Marco is on the south shore of the pass, about $2\frac{1}{2}$ miles above the Outer buoy; at high water a draft of 9 feet can be carried over the bar and up to the village, and about 7 feet through the pass to its southern entrance.

GENERAL DIRECTIONS, BIG MARCO PASS.

These directions are good in the daytime, with clear weather, for vessels of $5\frac{1}{2}$ feet draft as far as the anchorage in the entrance. Local knowledge is necessary for the navigation of the pass above the entrance.

Approaching and Entering.—Approaching the entrance keep in 3 fathoms of water until the Outer buoy (black, can, No. 1) is sighted. Bring the Outer buoy to bear NNE. and steer for it on this bearing; leaving it 50 yards on the port hand steer about N. by W. $\frac{1}{2}$ W. so as to leave red buoy No. 2 about 50 yards on the starboard hand and black buoy No. 3 about 20 yards on the port hand. Then steer about NE. $\frac{1}{2}$ E. for the Channel buoy, which should be left close-to on either hand; from this buoy follow the channel, which is fairly well defined by the shoal on its northern side, until inside the north point of the entrance. Anchor just inside the north point.

Remarks.—The channel over the bar is liable to shift in westerly gales, but the buoys can usually be depended on to lead in the best water; they are the only aids of use to a stranger.

Persons acquainted with the pass can be found outside the pass, at Key West, or at Punta Rasa.

SAN CARLOS BAY ‡

is 110 miles N. $\frac{1}{2}$ W. from Northwest Passage Lighthouse and about 20 miles to the southward of Charlotte Harbor, with which it is connected by two shallow bodies of water known as Pine Island Sound and Matlacha Pass. The bay is full of shoals between which there are several channels which form good anchorages for vessels of 9 feet or less draft, this being about as deep a draft as can be taken into the bay. The entrance, which leads into the bay from the southward, is obstructed by extensive shoals and is marked at its western point by Sanibel Island Lighthouse (see table, page 10). Between the shoals are two channels through which the bay may be entered: the Main Channel, which has a least depth (1896) of $8\frac{1}{2}$ feet, is marked by several buoys; the other channel, known locally as "The Swash," leads close around the eastern point of Sanibel Island and is continually shifting, the depths ranging from 5 to 7 feet.

* Shown on chart 173, scale $\frac{1}{80,000}$, price \$0.50.

† Shown on chart 174, scale $\frac{1}{80,000}$, price \$0.50.

‡ Shown on charts 175, scale $\frac{1}{80,000}$, price, \$0.50; 473, scale $\frac{1}{40,000}$, price \$0.25.

The deepest draft of the vessels entering the bay is 9 feet; under very favorable conditions a draft of about 11 feet might be taken to either Punta Rasa or St. James City. San Carlos Bay and the adjacent waters is the resort of tourists and fishermen during the winter, and is frequented principally by small local vessels and yachts.

Punta Rasa consists of a hotel, containing the post office and telegraph station, and a few houses on a point on the eastern shore of San Carlos Bay near the entrance of Caloosa River. Cattle are shipped in schooners from this point to Key West and Cuba, and it is one of the landings for steamers running between Punta Gorda and the Caloosa River. There is 12 feet of water at the ends of the two wharves and a depth of about 4 fathoms in the channel abreast of the hotel.

St. James City is a post village and winter resort on the south end of Pine Island. A narrow channel, with a least depth of about 9 feet, leads along the northeast side of Sanibel Island to the long wharf at St. James City. The steamers plying between Punta Gorda and the Caloosa River land at this wharf.

Matlacha Pass is the name of the shallow body of water leading from San Carlos Bay along the east side of Pine Island into Charlotte Harbor. When the water is high a draft of about 4 feet can be taken through the pass, but the channel is very narrow and crooked in places and is only used by small spongers and fishermen.

Pine Island Sound is the large, shallow body of water on the west side of Pine Island; it extends to the northward from the western end of San Carlos Bay, nearly 15 miles, to Charlotte Harbor. The sound is full of shoals, through which there is a channel good for a draft of about 7 feet at high water. There are no aids to assist a stranger in Pine Island Sound and a pilot should be employed either at Punta Rasa or in Charlotte Harbor. Vessels of 3 to 4 feet draft may pass through by aid of the chart. There are two passes through which Pine Island Sound can be entered from the Gulf of Mexico: **Blind Pass** has a depth of 7 feet, but only 2 feet can be taken through into the sound at low water; **Captiva Pass** has a depth of 5½ feet and this depth can be taken into the sound. Neither of these passes is used except by small local vessels since the bars at their entrances are liable to shift and there are no aids to assist in entering.

Caloosa River empties into the northeastern part of San Carlos Bay from the eastward; its length from **Lake Okeechobee** to the bay is about 71 miles. For the first 18 miles from its mouth the river is broad and, in a narrow and crooked channel, has a least depth of 6 feet, but above this it is narrow and at its head is connected with Lake Okeechobee by a canal 22 feet wide and 5 feet deep. Light draft steamers (of about 3½ feet) can pass up this river into Lake Okeechobee.*

Myers is a town on the south bank of the river 14 miles above its mouth and can be reached by vessels of about 7 feet draft; steamers from Punta Gorda make this the end of their route. The principal villages on the river are **Alva** and **Fort Thompson**, 20 and 38 miles, respectively, above Myers. No stranger should attempt to enter the river without a pilot, as the channel is so narrow and crooked at its entrance that even the local steamers plying here often run aground.

Prominent features.—Sanibel Island Lighthouse (see table, page 10), on the western side of the entrance to San Carlos Bay, is the most prominent and easily recognized mark anywhere for a distance of 50 or 60 miles along the coast. The hotel at Punta Rasa also forms a good mark for vessels standing into the bay through the Main Channel; on a clear day the hotel can be seen at a distance of 6 or 7 miles when approaching from the southward.

Anchorage.—Good anchorage will be found in 14 to 16 feet of water, sticky bottom, at the entrance to the Main Channel and about 3½ miles ESE. from Sanibel Island Lighthouse. Vessels standing up the coast and headed off by northerly winds will find a lee and good anchorage under the southern end of Sanibel Island in 16 to 24 feet of water, with Sanibel Island Lighthouse bearing anywhere between NE. and N. by W. The anchorage off Punta Rasa is good, but the tidal currents are very strong. There is a good anchorage along the shore of Sanibel Island inside the lighthouse; the currents here are strong, but bottom with spots of good holding ground can generally be found. Off St. James City there is an excellent anchorage with 12 to 18 feet of water and good holding ground; at this point the tidal currents are weaker than at any of the other anchorages in San Carlos Bay.

Pilots.—There are no licensed pilots and pilotage is not compulsory; strangers of over 8 feet draft, or if bound into the Caloosa River, should lie-to, or anchor, about 1 mile to the northward of black can buoy No. 1 and make the pilot signal; some competent person will come out to pilot the vessel in.

Quarantine.—Vessels subject to visitation by the health officer should not pass above red buoy No. 6 before being boarded. (See the quarantine laws for the State of Florida, Appendix I.)

Supplies.—Provisions can be had at Myers and St. James City.

Tides.—See the table on page 21 and remarks on page 23.

* Improvements have opened a water route about 4 feet in depth and 300 miles (statute) long from the Gulf of Mexico to the interior of Florida via San Carlos Bay, Caloosa River, Lake Okeechobee, Kissimmee River, and lakes Kissimmee, Cypress, and Tohopekalga.

SAILING DIRECTIONS, SAN CARLOS BAY.

These directions are good, in the daytime, for vessels of 8 feet draft at low water and 9 feet draft at high water; vessels of deeper draft should employ some one with local knowledge, and no stranger should attempt to enter at night.

1. *Approaching from the Southward.*—When to the northward of Cape Romano give the shore a berth of 2 miles. A **NNW. $\frac{1}{2}$ W.** course made good from Big Marco Pass will lead to the black can buoy off the entrance to San Carlos Bay. Or, when Sanibel Island Lighthouse is sighted, steer so that it will be distant nearly 4 miles when it bears **NW.**, and pass to the eastward of the black can buoy off the entrance; then follow the directions in section 2.

Remarks.—In clear weather and when near the buoy off the entrance, the hotel at Punta Rasa will show conspicuously on the end of the point which is 2 miles to the northward of Sanibel Island Lighthouse. As soon as the hotel is sighted it should be brought to bear **NW. $\frac{1}{2}$ N.**; standing in on this bearing the course will lead fair in the channel. Until up to the buoy (black, can) off the entrance, unless the hotel bears **NW. $\frac{1}{2}$ N.**, the vessel should be kept in at least 18 feet of water. The shoal which makes to the southeastward from the eastern point of Sanibel Island for a distance of 3 miles has as little as $1\frac{1}{2}$ feet of water over it in places; the black can buoy is about $\frac{1}{4}$ mile off the **SE.** point of this shoal.

1 A. *Approaching from the Northward.*—From the Entrance bell buoy off Charlotte Harbor steer **SSE. $\frac{3}{4}$ E.** for 15 miles, then **SE.** by **E.** for 6 miles, and then **E. $\frac{1}{2}$ N.** for 8 miles, to the buoy off the entrance to San Carlos Bay. Or, when about $6\frac{1}{2}$ miles to the southward of Gasparilla Island Lighthouse and clear of the shoals off Charlotte Harbor entrance, follow the shore of Captiva and Sanibel islands, giving it a berth of at least $1\frac{1}{2}$ miles. When Sanibel Island Lighthouse bears **NE.** steer about **E.** and keep in at least 18 feet of water until the black can buoy off the entrance is made; then follow the directions in section 2.

Remarks.—In standing along the shore of the islands which separate Pine Island Sound from the Gulf of Mexico there are no features easily recognized by a stranger. Captiva Pass, which is 7 miles to the southward of Gasparilla Island Lighthouse, shows a break in the shore. Blind Pass, 8 miles to the southward of Captiva Pass, can not be seen unless the vessel is too close inshore.

A vessel headed off by the wind may, when Sanibel Island Lighthouse bears about **NE.**, stand along the shore of the island at a distance of $\frac{1}{4}$ mile and anchor in 15 feet of water $1\frac{1}{2}$ miles from the lighthouse. (See, also, the remarks under section 1, preceding.)

2. *From the Entrance to Punta Rasa.*—When near the black can buoy off the entrance leave it on the port hand; bring the hotel at Punta Rasa to bear **NW. $\frac{1}{2}$ N.** and steer for it on this bearing. When red buoy No. 2 is made leave it about 75 yards on the starboard hand and steer about **NW. $\frac{1}{2}$ W.** for red buoy No. 4; when up to this buoy leave it 35 yards on the starboard hand; then steer for red buoy No. 6, which should be left 30 yards on the starboard hand, and when it is abeam haul to the northward a little and steer so as to leave red buoy No. 8 about 20 yards on the starboard hand. From red buoy No. 8 steer about **N.** and anchor off the hotel, or just above it, in about 4 fathoms of water.

Remarks.—After red buoy No. 2 has been passed the remaining buoys can be seen from each other. The shoal along the eastern side of the channel can readily be seen in clear weather, as can also the shoal on the western side of the channel abreast of Punta Rasa. The shoalest water on the bar is abreast of buoy No. 6, and care should be taken not to pass the buoy at too great a distance. The hotel at Punta Rasa is the largest building and close to the end of the point.

2 A. *From the Entrance to Sanibel Island Anchorage or St. James City.*—Leaving the black can buoy at the entrance on the port hand, bring the hotel at Punta Rasa to bear **NW. $\frac{1}{2}$ N.** and steer for it on that bearing. Leave red buoy No. 2 about 75 yards on the starboard hand and steer about **NW. $\frac{1}{2}$ W.** for $\frac{1}{2}$ mile; then steer **WSW.**, keeping the end of the lighthouse wharf a little on the port bow. Anchor above the wharf and about 150 yards from the beach.

CHARLOTTE HARBOR—DESCRIPTION.

Or, *if bound to St. James City*: From abreast the lighthouse wharf, follow the shore of Sanibel Island, giving it a berth of about 300 yards until abreast the second wharf above the lighthouse wharf and the hotel at Punta Rasa bears about **NE. $\frac{1}{2}$ E.**; then steer **NW.** by **N.** for nearly $1\frac{1}{2}$ miles, when the end of the long wharf at St. James City should bear **WNW. $\frac{3}{4}$ W.** Steer so as to leave the end of the wharf on the starboard hand, course **W.** by **N.**, and anchor about $\frac{2}{3}$ mile from the shore and abreast of, or just above, the wharf.

Remarks.—On the **WSW.** course care should be taken not to be set out of the channel by the tidal currents, which are strong. A shoal spit makes off some distance from the eastern point of Sanibel Island and a short distance to the eastward of the lighthouse wharf, but in clear weather this spit can usually be seen so as to be avoided. Between the first and second wharves above the lighthouse wharf there are several spots with 8 feet of water over them which may be avoided by giving the shore a berth of $\frac{1}{4}$ mile while between the wharves, hauling in to the beach when approaching the second wharf.

On the **NW.** by **N.** course the wharf and houses at St. James City will be on the port bow. The anchorage abreast of St. James City is the best in this vicinity for the larger vessels that enter San Carlos Bay

CHARLOTTE HARBOR *

is a large, irregularly shaped, landlocked bay in the west coast of Florida, and one of the best harbors in the state. Its entrance is 125 miles **N.** by **W.** $\frac{1}{4}$ **W.** from Northwest Passage Lighthouse, at the entrance to Key West Harbor, and 63 miles **SSE. $\frac{1}{4}$ E.** from the North Channel entrance to Tampa Bay. Charlotte Harbor has an average width of about 5 miles; it extends 10 miles in a general **E.** and **W.** direction and then about 10 miles in a general **N.** by **W.** and **S.** by **E.** direction, and is navigable for vessels of 11 feet draft to its head. The deepest draft of the vessels that can enter Charlotte Harbor is 21 feet; about 120 vessels enter every year for cargoes, the chief of which is phosphate that is loaded from lighters at the anchorage just inside Gasparilla Island. The harbor affords excellent shelter in all winds and is used as a harbor of refuge by coasters and other vessels.

The entrance to the harbor on its northern side is marked by Gasparilla Island Lighthouse and beacon (see table, page 10); these form a range for entering between the shoals which extend nearly $3\frac{1}{2}$ miles in a general **WSW.** direction from both sides of the entrance. The channel through these shoals is known as Boca Grande; it has a depth of 19 feet and, though quite narrow in some places, is well marked by buoys and the above-mentioned range. As great a draft as 15 feet can be taken in through Boca Grande when there is quite a heavy sea on, but vessels drawing more than 12 feet should not attempt to enter at such times except with a pilot on board; it is not advisable for a stranger of over 16 feet draft to enter without a pilot under any circumstances, as the depths in the channel are liable to change.

Gasparilla Sound extends, from just inside the entrance to Charlotte Harbor, to the northward about $7\frac{1}{2}$ miles; it is an irregularly shaped, shallow body of water, navigable for vessels of 4 to 5 feet draft. Gasparilla Pass, through which the sound is entered from the Gulf of Mexico, has a depth of 7 feet in the channel over the bar but requires local knowledge for its navigation. There are no towns on the shores of the sound and it is frequented only by small coasters, spongers, and fishermen.

Pine Island Sound and Matlacha Pass, both of which extend to the southward from Charlotte Harbor to San Carlos Bay, are described under heading San Carlos Bay.

Peace River empties into the northeastern end of Charlotte Harbor from the northeastward. The river is navigable for vessels of 6 feet draft to Liverpool, a village 12 miles above its mouth, and the tugs and lighters engaged in the transportation of phosphate go up the river a distance of about 26 miles. The channel in the river is well marked by pile dolphins as far as the Long Dock; it has been improved by dredging a channel about 150 feet wide from the vicinity of the upper stake light (Peace Creek beacon) to the Long Dock, and a basin 500 feet square at the end of the dock for steamers to turn in. Cleveland is a post village on the south bank of the river above Punta Gorda, and Charlotte Harbor and Harbor View are two post villages on the north shore opposite Punta Gorda.

Myacca River empties into the northwestern end of Charlotte Harbor from the northward; a depth of 9 feet can be taken into the mouth of the river. There are no towns on its shores, and only small vessels of 4 to 5 feet draft occasionally enter to carry freight to settlers scattered along its banks.

Punta Gorda, on the south bank of the Peace River, at its mouth, is the most important town reached by vessels through Charlotte Harbor. The town has railroad communication with the interior of the state and a line of steamers from New Orleans to Tampa, Key West, and Habana call here once a week. A steamer

* Shown on chart 175, scale $\frac{1}{80,000}$ price \$0.50; the entrance is shown on chart 474, scale $\frac{1}{40,000}$ price \$0.25.

runs regularly between Punta Gorda and Myers, on the Caloosa River, carrying the mail. The deepest draft of the vessels that go to the town is 12 feet, but this draft requires a favorable tide. The vessels loading phosphate clear from Punta Gorda, and the agency for its shipment is located here.

Prominent features.—*Lacosta Island*, to the southward, and *Gasparilla Island*, to the northward of the entrance, are low and partly wooded and present no marked natural features that would be of use to a stranger. *Gasparilla Island Lighthouse* is on the south end of the island and will be recognized in clear weather while in 6 to 7 fathoms of water off Boca Grande. On the northern end of *Lacosta Island* is a large gray building which shows very plainly when still some distance outside the bar and the entrance is opened out. *Charlotte Harbor Lighthouse* (see table, page 10) is in Charlotte Harbor about $8\frac{1}{2}$ miles *ENE. $\frac{1}{4}$ E.* from *Gasparilla Island Lighthouse*; it marks the turning point where vessels change their course to the northward to stand up to the head of the harbor and Punta Gorda. The shores inside the entrance are low and wooded, presenting no natural features easily recognized by a stranger.

Channels.—The main channel through the shoals outside the entrance has a depth of 19 feet, but it is quite narrow until the crest of the bar is passed; inside the bar and up to *Gasparilla Island Lighthouse* the channel is about $\frac{3}{4}$ mile wide. From the deep-water anchorage inside *Gasparilla Island* up to *Peace Creek* beacon the depth in the channel is 12 feet, but this depth can only be carried by closely following the buoys and beacons and requires some local knowledge. A stranger should not depend on carrying a depth of over 10 feet in certain parts of the channel between *Gasparilla Island Lighthouse* and *Charlotte Harbor Lighthouse*; this depth can be carried, however, up to the Long Dock at Punta Gorda. Another channel, known as the *Swash Channel*, leads close around the southern end of *Gasparilla Island*, about 120 yards from the beach. This channel has usually about 7 feet of water and is used in smooth weather, when the shoals define the deep water, by small local craft. Strangers are advised not to use this channel for the reason that it is liable to change both in depth and direction.

Anchorage.—The best place for large vessels to anchor is in the deep water just inside the entrance; this is the anchorage where vessels load phosphate from lighters brought down to them by towboats. Good anchorage will be found anywhere in Charlotte Harbor where the bottom is soft. Vessels sometimes anchor at the mouth of *Peace River*, to the southwestward of *Peace Creek* beacon, and load to a draft of 12 feet; they then tow down to the lower anchorage to finish taking in cargo.

Quarantine.—The quarantine station is on *Gasparilla Island* a short distance to the northward of the lighthouse, and incoming vessels are boarded off the lighthouse by the quarantine officer. (See quarantine, Appendix I, and National Quarantines, Appendix IV.)

Pilots.—Pilotage is compulsory; pilots will come out to vessels outside the bar in answer to signal. Vessels desiring a pilot can, while waiting to be boarded by one, anchor outside the bell buoy off Boca Grande until a pilot comes on board. (See pilot rules, regulations, and rates, Appendix I.)

Harbor Master.—The berthing of vessels and disposal of ballast is under the direction of the harbor master. The state laws for the government of harbor masters are in force in this port. (See Appendix I.)

Wharves.—The depth of water at the end of the wharves at Punta Gorda ranges from $4\frac{1}{2}$ to 11 feet, the latter depth being at the Long Dock.

Supplies.—Limited quantities of bituminous coal can be obtained for steamers at Punta Gorda, or from lighters at the anchorage inside *Gasparilla Island*. Fresh water can be obtained at the wharves at Punta Gorda and from towboats in the harbor. Provisions and ship chandler's stores can be had at Punta Gorda.

Wind Signals of the United States Weather Bureau are displayed at the customhouse and can be seen by the vessels in the river near Punta Gorda.

Tides and currents.—The mean rise and fall of tides is a little more than 1 foot, but the force and direction of the winds influence the tides to a very marked degree. The currents are variable in strength, depending very much on the force and direction of the winds. (See table on page 21 and remarks on page 23.)

SAILING DIRECTIONS, CHARLOTTE HARBOR.

The following directions are good in the daytime, with clear weather, for a draft of about 16 feet over the bar and to an anchorage inside of *Gasparilla Island Lighthouse*. From this anchorage to Punta Gorda and the entrance to *Myacca River* the directions are good for a draft of 9 feet. Vessels of deeper draft should employ a pilot.

1. **Approaching and Entering from the Southward.**—If standing along the shore, give it a berth of 2 miles or more to insure a depth of 4 fathoms. When 7 miles to the southward of *Gasparilla Island Lighthouse* and *Captiva Pass* bears *ENE.*, haul offshore, steering about *NW.*, so as to be at least 4 miles to the westward of the lighthouse.

Bring Gasparilla Island Lighthouse to bear **NE. $\frac{3}{4}$ E.** and steer for it on this bearing; pass close to the bell buoy and continue the course until up to the Bar buoy (can, white and black perpendicular stripes). From this buoy steer about **NE.**; leave black can buoy No. 1 about 200 yards on the port hand and red nun buoy No. 2 about 100 yards on the starboard hand. When abreast the latter buoy, steer about **ENE.** for Mid-channel buoy; leave this buoy close-to and steer **ENE. $\frac{1}{2}$ E.**, so as to leave Gasparilla Island Lighthouse a little over $\frac{1}{2}$ mile on the port hand. When the lighthouse bears abeam:

If bound to the anchorage, steer **NE. $\frac{3}{4}$ N.** and anchor in 4 fathoms of water with the lighthouse bearing **WSW.**, distant from $\frac{1}{2}$ to $\frac{3}{4}$ mile.

If bound to Punta Gorda, follow the directions in section 2, following.

Remarks.—Unless the weather is very clear Gasparilla Island Lighthouse will not be readily seen. In case of thick weather, and if at all doubtful of the position of the vessel, it is safe to anchor anywhere in 7 fathoms of water and wait for clear weather. A well-found seagoing vessel can ride out any gale on this coast when anchored in 7 to 8 fathoms. When standing for the bell buoy on the **NE. $\frac{3}{4}$ E.** course Gasparilla Range beacon will be in range with the lighthouse. Vessels of less than 13 feet draft can stand in on this range, leaving red nun buoy No. 2 on the port hand, until up to the Mid-channel buoy. The large building* on the north end of Lacosta Island will show prominently when the entrance is opened out. The shoals on the north side of the channel rise more abruptly than do those on the south side; the general width of the channel, from the Mid-channel buoy until inside the lighthouse, is about 800 yards. The southern end of Gasparilla Island is quite bold-to and can be approached as close as 200 yards.

Dangers.—A shoal extends in a general **SW.** by **W.** direction for a distance of $3\frac{1}{2}$ miles from the southern point of Gasparilla Island, and another shoal extends in the same general direction for a like distance from the northern end of Lacosta Island; these shoals are almost bare in spots, at times, and shift somewhat during heavy gales of wind. Their shoaler parts are usually marked by breakers and their local name is "sand bore." Near their western edge the shoals rise abruptly from 4 to 5 fathoms of water and it is advisable to give the lighthouse a berth of at least 4 miles until the bell buoy is sighted.

Inside Charlotte Harbor there are no dangers; the shoals, as a rule, rise gradually and the lead can be depended on to give sufficient warning to haul out of shoal water.

1 A. *Approaching and Entering from the Northward.*—If standing close along the shore, when Gasparilla Island Lighthouse bears **E.**, haul offshore so as to be over 4 miles from the lighthouse when it bears about **NE.** Or, keep offshore in a depth of 7 fathoms.

Bring Gasparilla Island Lighthouse to bear **NE. $\frac{3}{4}$ E.** and follow the directions in section 1, preceding. (See, also, the remarks under section 1, preceding.)

2. *From Gasparilla Island Lighthouse to Punta Gorda, or to the Entrance of Myacca River.*—With Gasparilla Island Lighthouse bearing **NNW.** and distant about 700 yards, steer **ENE. $\frac{1}{2}$ E.** with Charlotte Harbor Lighthouse a little on the port bow. Leave red nun buoy No. 4 on the starboard hand and red nun buoy No. 6 close-to on the starboard hand; black can buoys Nos. 3 and 5 should be left 100 yards on the port hand. Round black can buoy No. 5 at a distance of 100 yards and steer **N. $\frac{3}{4}$ W.** with Mangrove Point beacon ahead. Continue the **N. $\frac{3}{4}$ W.** course until the beacon is $\frac{1}{2}$ mile distant ahead, then:

If bound into Peace River, steer **N.** by **E. $\frac{1}{4}$ E.** Leave Peace Creek beacon 100 yards on the starboard hand and then steer so as to leave each of the 3-pile dolphins, which mark the southern edge of the channel, about 35 yards on the starboard hand; from the third dolphin steer for the end of the Long Dock. Anchor just above the end of the dock in 10 feet of water, or, *if bound up the river*, take a pilot.

If bound into Myacca River, continue the **N. $\frac{3}{4}$ W.** course, heading for Mangrove Point beacon, until the beacon is 600 yards distant ahead; then steer **WNW. $\frac{1}{4}$ W.** until up to black can buoy No. 7; leave this buoy on the port hand and steer about **NNW. $\frac{1}{4}$ W.**, keeping in the middle of the river. Anchor, or take a pilot, when 2 miles above the buoy.

* This building is gradually becoming a ruin; it may disappear at any time.

Remarks.—On the **ENE. $\frac{1}{2}$ E.** course, the buoys should be followed closely. A number of pile dolphins will be seen; they have been placed by local parties and should not be considered by a stranger. Charlotte Harbor Lighthouse, which should be visible soon after passing into the entrance, will assist in keeping the course.

After passing Charlotte Harbor Lighthouse, when on the **N. $\frac{1}{2}$ W.** course, **Mangrove Point** beacon will hardly be seen before the lighthouse is about 4 miles distant astern; the beacon should be made and kept bearing directly ahead on the course.

On the **N. by E. $\frac{1}{2}$ E.** course when bound into Peace River, a red wooden beacon (Peace Creek beacon) should be kept a little on the starboard bow; after passing this beacon the 3-pile dolphins marking the southern edge of the channel are the guides up to Long Dock.

TAMPA BAY AND TRIBUTARIES.*

Tampa Bay is a large, landlocked body of water in the west coast of Florida forming the best deep-water harbor in the state and one of the most important harbors, commercially, on the Gulf Coast of the United States. The bay, not considering its two tributary bays, is about 20 miles long in a general **NE.** and **SW.** direction and has an average width of about 7 miles; for a distance of 15 miles above its entrance it has a least depth of 22 feet in the channel. It is the approach to the City of Tampa and to Port Tampa, the latter being a railroad terminus and one of the important shipping points for phosphate and produce from this section of Florida. A draft of 22 feet can be taken in over the bar at the entrance at high water, but the deepest draft to which vessels have been loaded at Port Tampa is 20 $\frac{1}{2}$ feet.

The entrance to the bay is 182 miles **N. $\frac{1}{2}$ W.** from Rebecca Shoal Lighthouse and 283 miles **SE.** by **E. $\frac{1}{2}$ E.** from the entrance to Pensacola Bay; it is marked by **Egmont Key Lighthouse** (see table, page 10), and has shoals extending about 5 miles from the shore. Between these shoals there are two main channels: The **North Channel**, with a depth of 20 feet; and the **Southwest Channel**, with a depth of 16 feet. Both of these channels are well marked by the lighthouse and buoys and can be easily followed, but in the deeper draft vessels some local knowledge is required to carry the best water. **Egmont Key** lies fair in the entrance, and the shoals making off to the westward from it separate the two channels.

St. Petersburg is a small town and winter resort on the west shore of Tampa Bay 15 miles above Egmont Key Lighthouse; it is the terminus of a railroad, but has no shipping except the small steamers running from Tampa and Port Tampa and occasional fishermen. A long dock is built out from the town, at the end of which there is a depth of 15 feet; this dock and the buildings back of it can be plainly seen by vessels standing into Hillsboro or Old Tampa bays. A draft of 20 feet can be taken to a point abreast the town by following the East Channel to Port Tampa, and a draft of 12 feet can be taken to the wharf by following the South Channel.

HILLSBORO BAY

enters the northeastern end of Tampa Bay from the northward; it is 7 $\frac{1}{2}$ miles long in a general **N. by W.** and **S. by E.** direction and has a width of about 4 miles. The bay is full of shoals, but is good for a channel depth of 10 feet to within 2 miles of its head. **Hillsboro River**, emptying into the northwestern end of Hillsboro Bay, is a narrow stream at the mouth of which is the city of Tampa. The river is entered from the bay through a dredged channel which has (1896) a depth of about 6 $\frac{1}{2}$ feet; this channel is marked by stakes and is easily followed. There are three drawbridges at the city of Tampa, but vessels seldom go above the second bridge. A draft of 5 feet can be taken to the head of navigation 8 miles above the first bridge.

The city of Tampa is one of the most thriving cities in the State of Florida; its principal industry is the manufacture of cigars; all the customs business of Port Tampa is done here. The city is connected by railroad with the interior of the state and also with Port Tampa, which is about 6 $\frac{1}{2}$ miles distant in a southwesterly direction. Only small local steamers and small sailing craft are engaged in the trade to Tampa, produce and fish being the principal articles brought here for shipment by rail or for local consumption.

Alafia River empties into Hillsboro Bay from the eastward. The river entrance, obstructed by a bar over which the depth is 2 $\frac{1}{2}$ feet, lies 4 $\frac{1}{2}$ miles **NE.** by **E. $\frac{1}{2}$ E.** from **Gadsden Point**, the western point at the entrance to Hillsboro Bay. Phosphate is shipped from the phosphate works along the river in lighters, the one farthest up the river being 7 miles above its mouth. The deepest draft of vessels entering is 4 feet, the phosphate lighters usually drawing 3 feet when loaded.

OLD TAMPA BAY

enters the northwestern end of Tampa Bay from the northwestward; it is about 12 miles long in a general **NW.** by **N.** and **SE.** by **S.** direction and has an average width of about 6 miles. Its narrowest part is where it joins Tampa Bay; here its width is a little less than 2 $\frac{1}{2}$ miles. The bay is generally shallow but at its southern

* Shown on charts 177, scale $\frac{1}{80,000}$, price \$0.50; 477, scale $\frac{1}{40,000}$, price \$0.25.

end has several deep channels; one of these leads along the eastern shore of the bay at a distance of about $\frac{1}{2}$ mile from the beach and forms the approach to, and harbor of, Port Tampa. Between the deep water in Tampa Bay and the deep channel in Old Tampa Bay are two bars which have been improved by dredging, having (1896) channels about 120 feet wide and 19 feet deep. These dredged channels (or cuts) are marked by beacons which, with the buoys placed to mark the channel, make the approach to Port Tampa from Tampa Bay comparatively easy.

Port Tampa is situated on the east shore just inside the entrance to Old Tampa Bay; the long docks and buildings owned by the Plant railroad system are conspicuous marks when in the head of Tampa Bay. The deepest draft vessels entering the bay can lie at the docks and load with the best facilities for dispatch; the depth alongside the docks is 25 feet. Shipments from Port Tampa aggregate about 230,000 tons per year and are increasing. There are lines of steamers connecting this port with New Orleans, Mobile, Habana, and, in winter, with Jamaica; much of the phosphate is shipped in foreign steamers.

MANATEE RIVER

empties into the southern part of Tampa Bay from the eastward. The river is well settled along its banks but its only commerce is in market produce which is shipped in small steamers to Tampa and Port Tampa. The three principal post towns on the river are Manatee, Palmetto, and Braidentown. A draft of 8 feet can be taken to Palmetto, but only 6 feet to Manatee. The channel in the river as far as Manatee is well marked by buoys, beacons, and stakes, and is easily followed. There is good anchorage anywhere in the channel above **Shaws Point**, the first prominent point on the south shore above the dredged channel.

BOCA CEIGA BAY,

to the northward just inside the entrance of Tampa Bay, is very shallow; it extends along the coast, and just inside of a line of narrow keys, for a distance of 15 miles, to where it joins Clearwater Harbor. These waters are used only by small boats and local fishermen. **Pass a Grille** is the name of a pass, into Boca Ceiga Bay from the Gulf of Mexico, about 4 miles north from the southern end of Mullet Key; this pass has a depth of 7 feet and leads to a good anchorage between **Pine** and **Long** keys, but the channel is a shifting one and, as it is not marked, is of no use to a stranger.

SARASOTA PASS AND SARASOTA BAY

extend in a general SE. by S. direction from just inside the entrance to Tampa Bay for a distance of 18 miles; they stretch along the coast just inside of a line of narrow keys and form an inland passage for vessels of 4 feet or less draft. The channels are very narrow in many places and local knowledge is necessary for their navigation. There are several inlets to Sarasota Bay from the Gulf of Mexico. **Longboat Inlet**, 10 $\frac{1}{2}$ miles to the southeastward of Egmont Key Lighthouse, has a depth of 5 feet in the channel. **New Pass**, about 9 miles to the southeastward of Longboat Inlet, has a depth of 5 feet in the channel. **Big Sarasota Pass**, about 22 miles to the southeastward of Egmont Key Lighthouse, has a depth of 7 feet in the channel. These passes all lead to good anchorages in Sarasota Bay, for vessels that can enter by them, but the channels and passes shift and local knowledge is required to follow them. Strangers of less draft than the depths indicated might enter, in clear weather and with a smooth sea, by taking notice of the shoal water on each side of the channels and following the deeper water by sight. **Sarasota** is a post village on the mainland abreast Big Sarasota Pass. **Little Sarasota Bay** is a narrow, unimportant, shallow body of water which joins Sarasota Bay; it extends 10 miles to the southward just inside of a line of narrow keys, and is only navigable for small boats.

GENERAL INFORMATION.

Prominent features.—In clear weather Egmont Key Lighthouse is the first object easily recognized by a stranger. **Mullet**, **Egmont**, and **Anna Maria** keys are all low and wooded; to a vessel in 5 or 6 fathoms of water they present no features that a stranger can recognize. In thick or hazy weather nothing can be seen, and it is then advisable for vessels to anchor until the weather clears. Inside the bay the aids are so numerous as to make it nearly impossible, in clear weather, to get out of the channels.

Anchorage.—Well-found seagoing vessels, when approaching the entrance to the bay, if headed off by the wind, can anchor anywhere offshore in 6 to 8 fathoms of water and ride out a strong gale from any direction. There is good anchorage in 5 to 6 fathoms of water to the southward of Mullet Key off the quarantine station. Good anchorage is found off **Gadsden Point** to the southward of black buoy No. 9; vessels of over 8 feet draft, if bound to Tampa, sometimes anchor here to discharge part of their load. There is good anchorage off **St. Petersburg** in 4 fathoms of water, and a short distance above the docks at Port Tampa in 28 feet of water. A vessel bound up the bay can anchor anywhere in the channel, selecting, if possible, places where the bottom is soft.

Quarantine.—The quarantine boarding station is on the south side of Mullet Key. The quarantine anchorage is off the station and is marked by a yellow buoy. (See quarantine laws for the State of Florida, Appendix I, and National Quarantines, Appendix IV.)

Pilots.—A pilot boat will usually be found just outside or inside the bar. There is a pilot's lookout on Egmont Key, and the boat will go out to approaching vessels. The pilot laws for the State of Florida (see Appendix I) govern the pilots for Tampa Bay and the bar; the rates for pilotage are \$2.50 per foot of vessel's draft.

Towboats are used only by the deeper draft sailing vessels bound to Port Tampa and by some of the sailing vessels bound to Tampa. Vessels bound to Port Tampa are supplied with towboats by the railroad company when the vessel arrives at the lower cut into Old Tampa Bay. Vessels desiring to tow to Tampa from the entrance to the staked channel will have to arrange with some small steamer bound into the river.

Supplies.—Anthracite and bituminous coal for steamers can be had at Port Tampa, either alongside the wharves or from lighters in the stream. Fresh water can be had through pipes at the wharves at Tampa, Port Tampa, and St. Petersburg. Provisions can be had at Tampa, Port Tampa, and St. Petersburg. The supply store at Port Tampa for the steamers of the Plant system can furnish ship chandler's stores.

Repairs.—There are two marine railways at Tampa, each about 150 feet long and capable of hauling out vessels of 7 to 8 feet draft. Minor repairs to the machinery of steamers can be made at Tampa, and ordinary repairs at the shop in Port Tampa. It is contemplated building at Port Tampa a dry dock capable of floating vessels of 34 feet draft.

Wind Signals of the United States Weather Bureau are displayed at Tampa and on the docks at Port Tampa; the signals at the latter station can be seen by the shipping in the upper part of Tampa Bay and by vessels at anchor off Port Tampa.

United States Marine Hospital Service.—Medical attendance is furnished by a medical officer of the service at Port Tampa.

Tides.—For tidal data see table, page 21, and remarks on page 23.

Currents.—See general remarks on page 23.

SAILING DIRECTIONS, TAMPA BAY.

The directions for entering the bay by the North Channel (section 1) are good for vessels of 18 feet draft. The directions in section 1A, for entering the bay by the Southwest Channel, are good for a draft of 14 feet. The directions in section 2, for Port Tampa, are good for a draft of 18 feet; and the directions in section 2A, for Port Tampa by the South Channel, are good for a draft of 10 feet. The directions in section 2B, for Tampa, are good for a draft of 8 feet to the mouth of Hillsboro River, and for 6 feet up the river to Tampa. These directions are good for the drafts indicated only in the daytime and with clear weather, when the aids can be seen. A stranger of greater draft, or entering at night, should employ a pilot.

1. Approaching and Entering by the North Channel and to the Anchorage off Quarantine.—*From the Southward.*—Keep in over 6 fathoms of water and at least 5 miles offshore until Egmont Key Lighthouse is sighted. Bring the lighthouse to bear **E. $\frac{1}{2}$ S.**, distant over 5 miles, and steer for the lighthouse on this bearing until close to the whistling buoy. At night the vessel should then be in the narrow red sector of the light which covers the whistling buoy off the entrance. The red sector is indistinct, showing from the whistling buoy only by a marked dimness.

From the Northward.—Keep in over 5 fathoms of water and at least 5 miles offshore until Egmont Key Lighthouse is made. Bring the lighthouse to bear **E. $\frac{1}{2}$ S.** and steer for it until close to the whistling buoy.

From the whistling buoy steer **E.**, heading for the bar buoy (can, white and black perpendicular stripes); leave this buoy close to and continue the course, heading for the Middle buoy (nun, white and black perpendicular stripes), which should be left close to on either hand. From the latter buoy steer **E. $\frac{1}{2}$ S.**; leave a red nun buoy (No. 2) about 300 yards, and the northern point of Egmont Key about $\frac{1}{4}$ mile, on the starboard hand. Continue the **E. $\frac{1}{2}$ S.** course passing about $\frac{3}{8}$ mile to the southward of the southern point of Mullet Key, and anchor off the quarantine station in about 6 fathoms of water.

Or, if bound up the bay, follow the directions in section 2, 2 A, or 2 B, according to destination.

Remarks and dangers.—In clear weather Egmont Key Lighthouse will be easily seen and recognized from a distance of 8 miles. The shore to the southward and northward of the entrance is comparatively low and offers no marked features which would assist the navigator. A vessel approaching at night should keep well offshore and approach the entrance only on the bearing of the red sector until nearly up to the whistling buoy. A well-found seagoing vessel of over 300 tons can ride out a gale while at anchor in 7 to 8 fathoms of water anywhere along the coast.

On the E. $\frac{1}{2}$ S. course a red day beacon will be seen on the shoal to the southward of red buoy No. 2; this beacon is well on the shoal and must be given a berth of $\frac{3}{4}$ mile. When past the north end of Egmont Key the quarantine station, consisting of some buildings on the end of a wharf, will be seen on the south side of Mullet Key and on the north side of the channel.

Palatine Shoal consists of several small lumps having 17 and 18 feet of water over them. These lumps lie 5 miles W. from Egmont Key Lighthouse and $\frac{1}{4}$ mile SSE. from the whistling buoy at the entrance to the North Channel. A red and black horizontally striped buoy marks Palatine Shoal and this buoy should be given a wide berth. The long shoal which makes off to the westward from the northern side of the entrance has only 3 to 5 feet of water over it for a long distance, and is usually marked by breakers. The shoal making off to the westward from Egmont Key has depths of 5 to 17 feet, and is very irregular in shape. Both of these shoals are liable to shift during heavy gales, but the general direction and width of the channel between them does not alter so as to necessitate frequent changes in the sailing directions for entering. The tidal currents in the North Channel are usually strong and care should be taken not to be set off the course.

1 A. Approaching and Entering by the Southwest Channel and to the Anchorage off Quarantine.—*From the Southward.**—When approaching the northern end of Anna Maria (Palm) Key, give the shore a berth of over 3 miles, and while in 5 to 6 fathoms of water bring Egmont Key Lighthouse to bear **NNE. $\frac{1}{4}$ E.**; the lighthouse should be about 5 miles distant. Steer for the lighthouse on this bearing until up to the bell buoy which marks the entrance. At night the vessel should be in the narrow red sector which covers this buoy. The red sector is indistinct, showing from outside the bell buoy only by a marked dimness of light.

From the bell buoy make good a **NE. $\frac{3}{4}$ E.** course, leaving black buoy No. 1 about 250 yards on the port hand, a red beacon about $\frac{3}{4}$ mile on the starboard hand, and black buoy No. 3 about 50 yards on the port hand. When black buoy No. 3 is well on the port quarter steer about **NNE. $\frac{1}{4}$ E.** and anchor $\frac{1}{2}$ mile from the quarantine station.

Or, if bound up the bay, continue the **NE. $\frac{3}{4}$ E.** course from black buoy No. 3, and follow the directions in section 2, 2 A, or 2 B, according to destination.

Remarks and dangers.—Egmont Key is wooded to the southward of the lighthouse, but the top of the tower shows over the trees. Anna Maria (Palm) Key is sparsely wooded, and its northern end is low and bare. The opening between the northern end of Anna Maria Key and the small key to the northward, known as **Passage Key**, is called **Passage Key Inlet** and is used by small local vessels; it has a depth of 9 feet in a shifting channel, which is not marked.

On the north side of Southwest Channel are the shoals which make off from Egmont Key in a southwesterly and easterly direction; two black buoys, Nos. 1 and 3, mark the edge of these shoals; the southern point of the key is bold-to and a depth of 5 fathoms will be found 250 yards from the point. The shoals which make to the northward and westward from Passage Key, and which form the southern edge of the Southwest Channel, are marked by a red beacon placed 1 mile **WNW. $\frac{1}{2}$ W.** from the north end of Passage Key and nearly $\frac{1}{2}$ mile to the southward of the edge of the channel.

2. From the Quarantine Anchorage to Port Tampa.—*By the East Channel, for vessels of over 10 feet draft.*—From a position about $\frac{1}{4}$ mile **SSE.** of the quarantine station wharf steer **ENE. $\frac{1}{4}$ E.** so as to bring Mullet Key Shoal beacon (lighted) abeam, distant about $\frac{3}{4}$ mile. Then steer **NE. $\frac{3}{4}$ E.** for $6\frac{1}{4}$ miles, until up with Piney Point buoy (nun, red, No. 6), passing the South Entrance buoy (can, black and white perpendicular stripes) close-to, and keeping Indian Hill beacon (lighted) ahead. Leave buoy No. 6 close-to on the starboard hand and steer **NE.** by **N.** until up with North Entrance buoy (can, black and white perpendicular stripes), passing about $\frac{3}{4}$ mile to the eastward of black beacon No. 5 and about $\frac{1}{2}$ mile to the eastward of black buoy No. 7. When up to North Entrance buoy change course

* Vessels coming from the northward usually enter by the North Channel; the vessels using the Southwest Channel are of 14 feet or less draft and bound to or from the southward.

to **N.** by **E.** and pass midway between red buoy No. 2 and black buoy No. 1, when the Turn buoy (black and white perpendicular stripes) will be seen ahead. Steer for this buoy, and when close to it change course to **WNW.**, leaving the horizontally striped buoy, which will be seen ahead, about 100 yards on either hand, and keeping South Cut beacon (lighted) and beacon No. 6 on the starboard bow. When beacon No. 6 bears about **N.**, haul up to **N. $\frac{1}{2}$ W.**; leave beacon No. 6 about 20 yards on the starboard hand and pass through the dredged cut to beacon No. 8, which should also be left 20 yards on the starboard hand. After beacon No. 8 has been passed, steer **N.** by **E.** about $1\frac{1}{4}$ miles and enter the dredged cut, passing 20 yards to the westward of beacon No. 10; North Cut beacon (lighted) will be left well on the starboard hand. Pass 20 yards to the westward of beacon No. 12, and then steer **N.** by **E. $\frac{1}{2}$ E.** for the end of the railroad wharf, or to an anchorage in 28 feet of water just above the wharf.

Remarks.—Strangers should not attempt to go to Port Tampa at night without a pilot. On the **NE. $\frac{1}{2}$ E.** course the channel is about 2 miles wide between the 3-fathom curves and free from dangers. On the **NE.** by **N.** and **N.** by **E.** courses the channel narrows to about $\frac{1}{4}$ mile in width, and between buoys Nos. 1 and 2 it is less than $\frac{1}{4}$ mile wide. A stranger should follow the aids closely and should not attempt short cuts, as the shoals in many places rise abruptly from deep water.

2 A. *From the Anchorage off the Quarantine Station, to St. Petersburg, or, to Port Tampa.*—*By the South Channel, for vessels of 10 feet or less draft.*—From a position about $\frac{1}{2}$ mile **SSE.** of the quarantine station wharf steer **ENE. $\frac{1}{2}$ E.** so as to bring Mullet Key Shoal beacon (lighted) abeam and distant about $\frac{1}{4}$ mile. Then steer **NE. $\frac{1}{2}$ E.** for $4\frac{1}{2}$ miles, heading for Indian Hill beacon (lighted) and the South Entrance buoy (can, black and white perpendicular stripes). When up with this buoy steer **N. $\frac{1}{2}$ W.**, leaving black beacon No. 1 about 200 yards on the port hand and red buoy No. 2 about 200 yards on the starboard hand. Red beacon No. 4 should be left on the starboard hand about $\frac{1}{2}$ mile. When up with this beacon the railroad wharf at St. Petersburg will be seen a little on the port bow and, soon after, the mid-channel buoy off the end of the wharf will be sighted. Head for the latter, and when up to it anchor, in $3\frac{1}{2}$ fathoms, just to the eastward of it; or, if bound to Port Tampa, change course to **NE. $\frac{1}{2}$ E.** South Cut beacon (lighted) and red beacon No. 6 will be made a very little on the starboard bow. From this position follow the directions for Port Tampa given in section 2, preceding.

Remarks.—The **N. $\frac{1}{2}$ W.** course is steered for nearly $6\frac{1}{2}$ miles and care should be taken that the vessel is not set out of the channel by the current. The shoalest part of the channel is between beacon No. 1 and buoy No. 2, where there is about 12 feet at low water. A stranger should keep in the channel and not attempt to cross any of the numerous shoals. Good anchorage in 4 fathoms is found just south of the South Cut beacon.

2 B. *From the Anchorage off the Quarantine Station to an Anchorage off Tampa.*—*For vessels of less than 8 feet draft.*—Follow the directions in section 2 until up with the North Entrance buoy. Continue the **NE.** by **N.** course for about 3 miles farther; this will bring the vessel up to red buoy No. 8, which should be left close to on the starboard hand. From this buoy change course to **NE. $\frac{1}{2}$ N.** and continue it for $3\frac{1}{2}$ miles; two black buoys off Gadsden Point will be made a little on the port bow. Pass about 300 yards to the eastward of the second one, No. 11, and haul up to **N. $\frac{1}{2}$ E.** A white and black perpendicularly striped beacon will be seen on the port bow. Leave the beacon about 200 yards on the port hand and steer **N. $\frac{1}{2}$ W.** Then keep Long Shoal beacon (lighted) a little on the port bow and pass to the eastward of the beacon, hauling around it and heading about **WNW.** Ballast Point will be ahead and Middle Ground beacon (lighted) on the starboard bow.

When the large house on the shore at Ballast Point is a little over $\frac{1}{4}$ mile distant ahead haul up to **N.** by **W.** and pass the Middle Ground beacon, leaving it a little over $\frac{1}{4}$ mile on the starboard hand. When this beacon is abeam haul up a little more to the northward and bring Barrel Stake beacon (lighted) a little on the starboard bow; when about $\frac{1}{4}$ mile from the beacon anchor in 8 feet of water, soft bottom.

A vessel of less than 6 feet draft can proceed up to the city by leaving the stakes marking the channel about 45 or 50 feet on the port hand. At the point where the channel turns to the eastward, at the west shore near Spanish Town Point, there is a stake with a red

target; this stake and the one just above it are to be left on the starboard hand, but all the other stakes should be left on the port hand when entering.

Remarks.—In following the sailing directions care should be taken to pass at the proper distance from buoys and beacons, as a stranger cannot depend on recognizing any of the natural features along the shores of the bay. Ballast Point can be recognized by the large boathouse with glass front, which is situated close to the water.

On the N. by W. course care should be taken to avoid the Middle Ground. The staked channel can be readily followed up to the city, but the river is too narrow for a vessel of over 50 feet length to anchor and swing. Vessels of over 6 feet draft should employ some one with local knowledge to take them through the staked channel, and if a sailing vessel it will be necessary to employ a towboat.

Dangers.—The only danger that requires attention is the Middle Ground which has only 4 feet on it at low water; it extends about 1 mile to the southward of the Middle Ground beacon, and is about $\frac{1}{2}$ mile wide.

SAILING DIRECTIONS, MANATEE RIVER.

The directions are good in the daytime for a stranger of 6 feet draft as far as Palmetto; 8 feet is the deepest draft that can be taken there by those acquainted with the river, and about 7 feet as far as Manatee.

1. **From Tampa Bay to Palmetto.**—Stand for the entrance to Manatee River, taking care not to approach the shore closer than $1\frac{1}{4}$ miles until the large, black, lighted beacon at the entrance is sighted. Bring this beacon to bear about **SE. $\frac{1}{4}$ E.** and steer for it; when up to the perpendicularly striped Entrance Bar buoy steer about **SE.** by **E.**, leaving a black buoy and the beacon on the port hand, and then steer so as to leave the next black buoy on the port hand. From the latter buoy steer for a pile dolphin, with a red target, which will be seen near a large, red, lighted beacon. Leave the dolphin about 20 yards on the starboard hand and steer so as to leave the second dolphin, with red target, about 20 yards on the starboard hand.

When the second dolphin is abeam, steer about **ESE.**, heading so as to leave red buoy No. 2 on the starboard hand, black buoy No. 5 on the port hand, and red buoy No. 4 on the starboard hand. From the latter buoy haul a little to the southward and leave black buoy No. 7 on the port hand, and when this buoy is abeam steer **E.**, heading so as to leave two red buoys (Nos. 6 and 8) on the starboard hand. From red buoy No. 8, steer so as to pass about 150 yards to the southward of the longest dock which makes off from the north shore at Palmetto. Anchor in about 10 feet of water, 150 yards to the southwestward of the dock.

Remarks.—When approaching the entrance to Manatee River the two beacons and two dolphins will appear a little confusing, but when close to the entrance buoy the channel will be easily followed by taking notice of the aids in the order they are to be passed. At low water a sand ridge which is on the south side of the dredged cut, between the two dolphins, will show bare; and with clear, smooth water the shoals to be avoided can be plainly seen.

1 A. **Having entered Tampa Bay by the Southwest Channel.**—Having followed the directions in section 1 A, page 50, for entering by the Southwest Channel.—When up to buoy No. 3 (can, black), or when Egmont Key Lighthouse is abeam, steer **SE.** by **E. $\frac{1}{2}$ E.** for $4\frac{1}{4}$ miles, which course leads directly to the Entrance Bar buoy. Then proceed as directed in section 1, preceding.

Remarks.—Light draft vessels save considerable distance by using Passage Key Inlet, passing to the southward of Passage Key. Strangers are not advised to attempt this channel.

CLEARWATER HARBOR AND ST. JOSEPHS SOUND.*

Clearwater Harbor, about 20 miles to the northward of the entrance to Tampa Bay, is a shallow body of water extending about 7 miles in a general N. by E. and S. by W. direction and separated from the Gulf of Mexico by a narrow strip of beach, the southern part of which is known as Sand Key; it has an average width of about 1 mile and is full of shoals between which there are a number of narrow, crooked channels. Through these a

* Shown on chart 177, scale $\frac{1}{80,000}$, price \$0.60.

draft of 5 feet can be taken to **Clearwater**, a village on its western shore. **Big Pass** and **Little Pass** are the entrances to Clearwater Harbor. **Big Pass** is about 25 miles to the northward of Egmont Key Lighthouse and 9 miles to the southward of Anclote Keys Lighthouse; **Little Pass** is about 3 miles to the southward of **Big Pass**. These passes are not marked and the bars at their entrances are subject to change; about 4 feet can be taken into **Big Pass** and 6 feet into **Little Pass**. Strangers should not enter Clearwater Harbor without employing some one with local knowledge.

St. Josephs Sound enters the northern end of Clearwater Harbor; it extends northward nearly to Anclote Keys, being separated from the Gulf of Mexico for a part of the distance by a narrow strip of beach known as Hog Island. The sound is shallow and entered only by spongers and small coasters.

Sailing directions that would be of use to a stranger can not be given. In fine weather, when the water is smooth and clear, a stranger of 4 feet or less draft might enter Clearwater Harbor through **Big** or **Little** passes by the color of the water, the deeper water of the channel being usually darker than the water on the shoals.

ANCLOTE ANCHORAGE AND RIVER.*

Anclote Anchorage is to the eastward of Anclote Keys and just to the westward of the mouth of Anclote River; it is 35 miles to the northward of Egmont Key Lighthouse and 57 miles S. by E. $\frac{1}{2}$ E. from Cedar Keys Lighthouse. The **Anclote Keys** extend $2\frac{1}{4}$ miles in a general N. and S. direction and form a shelter against westerly gales, but the anchorage is good only for vessels of 7 feet or less draft, this being the greatest depth that can be taken in to the eastward of the keys. Vessels of more than 8 feet draft can find good anchorage to the westward of the keys; here they are exposed to westerly winds but, as the water shoals very gradually, there is never a very heavy sea, and vessels with good ground tackle can ride out anything but a hurricane.

On the southern end of the largest of the keys is **Anclote Keys Lighthouse** (see table, page 12); this is the most prominent and easily recognized mark in this vicinity and the principal guide to the anchorage, or for vessels entering Anclote River. Buoys are placed to mark the best water when passing to the eastward of Anclote Keys, either from the southward or northward.

Anclote River is a short, shallow river and the approach to **Tarpon Springs**, a post village and winter resort. The river entrance is obstructed by a bar which extends to Anclote Anchorage; through this bar there is a narrow, crooked channel which has a depth of about 4 feet up to Tarpon Springs; the deepest draft of the vessels going there is 5 feet, the river being entered only by small craft. **Anclote** is a post village about $1\frac{1}{4}$ miles above the entrance of the river; 5 feet is the deepest draft taken there.

Prominent features.—Anclote Keys Lighthouse is the best and most easily recognized lighthouse on the west coast of Florida between San Carlos Bay and Cape San Blas; the clump of tall trees near the lighthouse forms a conspicuous landmark for vessels standing along the coast and well offshore.

SAILING DIRECTIONS, ANCLOTE ANCHORAGE, INSIDE OF ANCLOTE KEYS.

The directions in section 1, for entering by the Southwest Channel, are good for a draft of 7 feet, and the directions in section 1 A, for entering by the Northwest Channel, are good for a draft of 6 feet. A stranger should not attempt to pass to the eastward of the keys at night. It must be noted that the buoys in both channels are placed for entering from seaward to the anchorage.

1. Entering by the Southwest Channel.—Keep in not less than 3 fathoms of water and bring Anclote Keys Lighthouse to bear **NNE. $\frac{1}{2}$ E.** Steer for it on this bearing. South buoy (nun, red, No. 2) will be made ahead and should be left close-to on the starboard hand. Then steer **NE. $\frac{1}{2}$ E.**, leaving buoy No. 4 (nun, red) close-to on the starboard hand and continue the course for Turn buoy (can, black and white perpendicular stripes), which will be seen ahead. When up with this buoy, or when Anclote Keys Lighthouse bears **NNW.**, steer **NNE.** for buoy No. 1 (can, black), which leave close-to on the port hand. From this position, if wishing to anchor for shelter, haul up a little more to the northward and anchor in 9 feet of water, soft bottom. If desiring to enter the Anclote River take a pilot, as there are no aids to assist a stranger.

If desiring to pass through between the keys and the mainland, when up to black buoy No. 1 and the lighthouse bears about **SW. by W. $\frac{1}{2}$ W.**, steer **N. by E. $\frac{1}{2}$ E.** for about $2\frac{1}{4}$ miles

* Shown on chart 178, scale $\frac{1}{80,000}$, price \$0.50.

ANCLOTE ANCHORAGE—SAILING DIRECTIONS.

and until up to black buoy No. 1; leave this buoy close-to on the starboard hand; from it steer **N. $\frac{3}{4}$ E.** for Turn buoy (can, black and white perpendicular stripes); from the latter buoy steer **NW. $\frac{1}{2}$ W.**, and when up to red buoy No. 4, which should be left close-to on the port hand, steer **W.** for North buoy (red, No. 2).

Remarks.—When standing along shore to the southward of the keys the clump of tall trees on the north end of **Hog Island** will show well offshore. Anclote Keys Lighthouse will be seen above the clump of trees which stands near it on the south end of the key. The shoals are so numerous that a detailed description of them would be confusing; when the water is clear many of them may be seen and avoided. A stranger should closely follow the buoys, which will lead in the best water and clear of all shoals.

1 A. Entering by the Northwest Channel.—Keep in not less than 12 feet of water till about $5\frac{1}{2}$ miles to the northward of Anclote Keys Lighthouse; then bring the lighthouse to bear **SSE.** When in this position North buoy (nun, red, No. 2) should be close aboard. Leaving this buoy close-to on the starboard hand steer **E.** for buoy No. 4 (nun, red) and leave it also close-to on the starboard hand. When abreast this buoy change course to **SE. $\frac{1}{4}$ E.** for Turn buoy (black and white perpendicular stripes). From this buoy steer **S. $\frac{3}{4}$ W.** for buoy No. 1 (can, black), which leave close-to on the port hand. From this position steer **S.** by **W. $\frac{1}{2}$ W.** and anchor in 9 feet of water, soft bottom. A pilot should be taken if desiring to proceed up the Anclote River.

Remarks.—The shoalest part of the channel is at buoy No. 1, where there is only $6\frac{1}{2}$ feet at low water. There is a very narrow channel leading into the anchorage just to the northward of **North Anclote Key** and inside of the shoal making out to the northward. This channel has good water, but should not be attempted by strangers.

Shoals extend northward from near **North Anclote Key** for $1\frac{1}{2}$ miles and to the eastward for 1 mile. (See, also, the remarks under section 1, preceding.)

SAILING DIRECTIONS, ANCHORAGE OUTSIDE ANCLOTE KEYS.

The following directions are for vessels that can not reach the anchorage inside Anclote Keys on account of too great draft. Because of the gradual slope of the bottom the sea is comparatively smooth, even in westerly gales, and vessels will find this a safe anchorage.

Bring Anclote Keys Lighthouse on any bearing between **SE.** by **E.** and **SE.** by **S.** and stand in on this bearing. Take careful soundings and anchor as far inshore as the vessel's draft will safely permit.

COAST FROM ANCLOTE KEYS TO CEDAR KEYS.*

This stretch of the coast, about 60 miles in length, is low and broken by a number of shallow creeks and rivers which can only be entered by small boats. The approach to the shore is very shoal; a depth of 5 feet is found in some places 7 miles from the beach, while a depth of only 18 feet is found 15 miles offshore. A number of shoal spots and rocks extend along the coast at a distance of 6 miles from the shore; these are known under the general name of **St. Martins Reef**. There are no cities or towns and no commerce, the only vessels standing inshore close enough to sight land being spongers and fishermen; these sometimes anchor in shoal water, in places where the bottom is soft, and ride out the heaviest gales. Strangers should be very careful in approaching the shore as the depths are very irregular inside a depth of 10 feet; the vessels of deep draft should keep in 5 to 6 fathoms of water. There are a few post villages along this stretch of the coast, of which **Bayport** is the largest; it is situated about 25 miles to the northward of Anclote Keys Lighthouse.

CEDAR KEYS†

is the name of a harbor formed by a number of keys lying off a point on the west coast of Florida about 90 miles to the northward of the entrance to Tampa Bay and nearly 110 miles **ESE. $\frac{3}{4}$ E.** from Cape St. George. On **Seahorse Key**, the outer key of the group, is **Cedar Keys Lighthouse** (see table, page 12). Extending in a **SSW. $\frac{1}{4}$ W.** direction from this lighthouse, for a distance of $10\frac{1}{2}$ miles, is **Seahorse Reef**, which has from 4 to 19

* Shown on charts 178, 179, scale $\frac{1}{80,000}$, price of each \$0.60.

† Shown on charts 179, 180, scale $\frac{1}{80,000}$, price of each \$0.50; 480, scale $\frac{1}{60,000}$, price \$0.20.

feet of water over it; at its outer end it rises abruptly from a depth of about 4 fathoms. A red bell buoy is moored in 22 feet of water about $\frac{1}{2}$ mile from the outer end of the reef.

The town of Cedar Keys is at the head of the harbor and is the terminus of a railroad. It has a little trade in red cedar, sponges, and fish, and ships some lumber by rail. Steamers of 3 feet draft trading on the Suwannee River tow rafts of cedar logs to the mills in the town and on Depot Key. The depth of water alongside the wharves is about 11 feet and this is the greatest draft that can be taken to the town at high water.

Prominent features.—About 2 miles NE. $\frac{1}{2}$ N. from the outer end of Seahorse Reef and in 9 feet of water is Seahorse Reef Outer beacon; this is a pyramidal skeleton structure of iron 52 $\frac{1}{2}$ feet high and painted black. Cedar Keys Lighthouse is 8 $\frac{1}{2}$ miles NNE. $\frac{3}{4}$ E. from the beacon and is the guide to the entrance of the buoyed channel. On the northwestern end of Depot Key is a tall, gray furnace which resembles a beacon when standing in through the buoyed channel.

Channels.—The main channel has a least depth at low water of 9 feet, which is said to be decreasing; it is well marked by buoys and, although narrow and crooked, is easily followed in the daytime with clear weather. Opposite the town the channel leads through a dredged cut in the Middle Ground; this cut is narrow and the tidal currents set directly across it. There are two channels which enter the harbor from the westward and lead to the northward of the outlying keys; these channels are not marked and the best depth taken in through them is about 4 feet; local knowledge is necessary for their use. There is also a channel, with a depth of about 6 feet, for entering from the eastward, but it is not marked.

Supplies.—A limited quantity of provisions and fresh water may be obtained in the town.

Anchorage.—The best anchorages are between black buoy No. 11 and the wharves on Depot Key, and abreast the wharves of the town. Vessels waiting for a fair wind to enter by the Main Channel can anchor in 14 feet of water with the lighthouse bearing N. by E., distant 2 $\frac{1}{2}$ miles.

Quarantine.—Vessels subject to visitation by the health officer must not go above Grassy Key before they have been boarded and pratique has been obtained. (See, also, state quarantine laws, Appendix I, and National Quarantines, Appendix IV.)

Pilots.—Vessels desiring a pilot should stand in for the lighthouse on a N. by E. bearing and anchor in 15 feet of water, with signal set, until some one comes out. There are no regularly licensed pilots and no regular rates for pilotage. (See pilot laws for State of Florida, Appendix I.)

Repairs.—There is one marine railway capable of taking out vessels of 10 tons; only minor repairs to small vessels can be made.

Currents.—The currents follow the channel, except in the Middle Ground Cut, across which the flood sets E., and the ebb W., very strongly.

Tides.—See the table on page 21 and remarks on page 23.

Fogs.—There is considerable fog during the winter months; southerly winds bring it in and northerly winds clear it away.

Wind Signals of the United States Weather Bureau are displayed at a special display station at Cedar Keys. (See Appendix II.)

SAILING DIRECTIONS, CEDAR KEYS.

The following directions are good in the daytime, with clear weather, for vessels of 8 feet or less draft. Vessels of deeper draft should employ a pilot.

1. **Approaching from the Southward.**—From St. Martins Outer Shoal buoy make good a N. by W. $\frac{1}{4}$ W. course for 39 $\frac{1}{2}$ miles. Or, when off the entrance and to the eastward of Seahorse Reef, bring Cedar Keys Lighthouse to bear N. by E. and steer for it on this bearing until up to the Outer Bar buoy. Then follow the directions in section 2, following.

A vessel coming from the southward and sighting the bell buoy or the beacon should pass 1 $\frac{1}{2}$ miles to the eastward of them and steer NNE. $\frac{3}{4}$ E. until Cedar Keys Lighthouse or the Outer Bar buoy is sighted, or, if the lighthouse and buoy are not seen, until the water shoals to 14 feet.

Remarks.—Cedar Keys Lighthouse is difficult to distinguish in the daytime, and strangers must approach the entrance with caution if not certain of their position. Shoals with 14 to 18 feet over them extend nearly 7 miles to the southward from Cedar Keys Lighthouse and with less than 12 feet for a distance of 4 miles. Along the coast, for a distance of 30 miles to the southward of Cedar Keys, the 18-foot curve is 15 miles

offshore, so that no land will be sighted by a vessel passing along shore in 3 fathoms or more of water. On the western side of the approach is Seahorse Reef, which extends $10\frac{1}{2}$ miles in a **SSW. $\frac{1}{2}$ W.** direction from Cedar Keys Lighthouse; the depths over this reef range from 1 foot near its inner, to 10 and 11 feet at its outer end. Nearly 2 miles from the outer end, and on the reef, is an iron, skeleton, pyramidal beacon, $52\frac{1}{2}$ feet high, with a spherical cage-work day-mark on top. Outside the reef and about $2\frac{1}{2}$ miles **SSW. $\frac{1}{2}$ W.** from the beacon is a red bell buoy.

1 A. *Approaching from the Northwestward or Westward.*—Vessels approaching Cedar Keys should keep in 5 fathoms of water until either Seahorse Reef Outer beacon or the bell buoy is sighted (the bell buoy is $2\frac{1}{2}$ miles **SSW. $\frac{1}{2}$ W.** from the beacon). As soon as the bell buoy is made, on any bearing to the eastward of **S. by E.**, steer for the buoy; leave it close-to and steer **NE. by E.** for 5 miles; then steer **N. by E.** Cedar Keys Lighthouse should be made ahead; continue this course for the lighthouse, and when up to the Outer Bar buoy follow the directions in section 2, following.

Remarks.—For a distance of 25 miles to the northwestward of Cedar Keys the 18-foot curve extends along the coast about 10 miles offshore. The **Northwest Channel** is used by local vessels and those familiar with the local marks for keeping in the best water, but no stranger should attempt it. (See, also, the remarks under section 1, preceding.)

2. *From the Outer Bar Buoy to the Anchorage off the City.*—Leave the Outer Bar buoy about 30 yards on the port hand and steer about **N. by E. $\frac{1}{2}$ E.**, heading so as to leave black buoys Nos. 3 and 5 about 30 yards on the port hand; from the latter buoy steer about **NE. $\frac{1}{2}$ N.**, leaving red buoy No. 2 about 50 yards on the starboard hand. Then steer about **N.**, leaving red buoy No. 4 about 80 yards on the starboard hand and passing midway between black buoy No. 7 and red buoy No. 6; leave red buoy No. 8 and the red beacon on the starboard hand, giving the buoy a berth of 20 yards. From this buoy (No. 8) steer about **NE. $\frac{1}{2}$ E.**, leaving black buoy No. 9 about 16 yards on the port hand; when up to red buoy No. 10, which should be given a berth of 20 yards on the starboard hand, steer about **N.**, passing to the eastward of a low, grassy key. Leave red buoy No. 12 about 25 yards on the starboard hand and haul up so as to leave black buoy No. 11 about 30 yards on the port hand. From the latter buoy steer about **NE. by N.** and anchor so as to swing just clear of the wharf at the cedar mill on Depot Key.

Remarks.—The courses given are only to assist in finding and locating the buoys, which should be the only guides and which should be closely followed and left at the distance given. The entrance to the Middle Ground Cut is marked by a black beacon; there is a local range for passing through the cut which can not be described so as to be of use to a stranger. The anchorage off Depot Key is very narrow and only fit for small vessels.

COAST FROM CEDAR KEYS TO APALACHEE BAY.*

From Cedar Keys the coast extends in a general northwesterly direction 75 miles and for that distance is low marsh backed by woods. It is broken by a number of unimportant creeks and rivers some of which are navigable for vessels of 4 to 5 feet draft. The gulf along this stretch of the coast is the resort of spongers and fishermen during the spring and summer; they and the small vessels carrying cedar from the rivers and creeks are the only vessels frequenting this part of the gulf. Strangers desiring to enter any of the rivers and creeks should employ some fisherman or sponger who is familiar with the approach to the locality bound for.

Suwannee River empties into the gulf from the northeastward, its entrance being $12\frac{1}{2}$ miles **NNW. $\frac{1}{2}$ W.** from Cedar Keys Lighthouse. The river has some trade in lumber carried in vessels of 5 feet or less draft; it is navigable to **New Brandford**, a distance of 69 miles, for vessels of 5 feet draft and about 100 miles for vessels of 3 feet draft. A passage, marked in places by stakes, leads from Cedar Keys to the entrance of the river. The principal entrance is through **East Pass**, which has been dredged. Improvements are in progress to obtain a depth of 4 feet in the channel up to **Ellaville**, a distance of about 110 miles.

Steinhatchee River empties into the gulf about 40 miles to the northwestward of Cedar Keys Lighthouse. The coast here forms a broad, shallow bight known as **Deadmans Bay**. The river is obstructed at its entrance by a bar over which the channel depth is about 4 feet; inside the entrance there is a good depth of water. Strangers seldom enter the river, and local knowledge is necessary for its navigation.

* Shown on charts 180, 181, scale $\frac{1}{80,000}$ price of each \$0.50.

Fenholloway River empties into the gulf about 65 miles to the northwestward of Cedar Keys Lighthouse. The river can be entered by small vessels of 4 to 5 feet draft at high water, but is of little commercial importance. Strangers should not attempt to enter without the aid of some one possessing local knowledge.

In clear weather, while standing along this stretch of the coast, the land will be seen while in 3 fathoms or more water; but it is not possible for a stranger to recognize any feature which might assist him in locating his position. The lead is of the greatest assistance to keep a vessel at a safe distance from shore as the water shoals gradually until inside the 12-foot curve.

The average rise of the tides on the coast between Cedar Keys and Apalachee Bay is $2\frac{1}{2}$ feet.

APALACHEE BAY*

is the shallow indentation in the coast of Florida about 75 miles to the northwestward of Cedar Keys Lighthouse. The eastern limit of the bay is not well defined but its western limit is marked by **Lighthouse Point**, the southeastern point of **St. James Island**. Emptying into the bay from the northward and northwestward are a number of unimportant streams and shallow bays which are sometimes frequented by spongers and fishermen. Shoals with a depth of less than 18 feet almost fill the bay, and, with the exception of **St. Marks Lighthouse** (see table, page 12) and the buoys in the entrance to **St. Marks River**, there are no aids that can be used by a stranger.

Aucilla River empties into Apalachee Bay from the northward; its entrance, which is obstructed by a mud and oyster bar, is about 10 miles to the eastward of **St. Marks Lighthouse** and has a depth of about 3 feet. Small vessels of 5 feet or less draft enter the river for cargoes of cedar wood.

St. Marks River empties into Apalachee Bay from the northward and is the approach to the village of **St. Marks**, about 6 miles above its mouth. The river is crooked and, at its entrance and for a distance of 3 miles above, is full of shoals between which a narrow channel, with a depth of about 7 feet, leads up to the village; a depth of 4 feet can be taken about 10 miles above **St. Marks**. On the eastern point, at the entrance, is **St. Marks Lighthouse**, and marking the channel off the entrance are several buoys. The anchorage in the channel bears about **NW.** from the lighthouse and is known as **Spanish Hole**. Spongers and fishermen occasionally anchor here for shelter in heavy gales.

Ocklockonee Bay is a shallow bay making to the northwestward from Apalachee Bay about $3\frac{1}{4}$ miles to the northward of **Lighthouse Point**. The **Ocklockonee River**, a stream navigable for a draft of 4 feet a distance of about 40 miles, empties into the head of the bay. The river, about 8 miles above its mouth, connects with **Crooked River**, which enters it from the westward and affords a narrow inland passage, with a depth of 3 feet, to the **Carrabelle River**.

The shore of Apalachee Bay, between the entrances of **St. Marks River** and **Ocklockonee Bay**, is broken by a number of shallow bays of no importance whatever.

The mean rise and fall of tides at **St. Marks** is $2\frac{1}{2}$ feet. (See table, page 21, and remarks on page 23.)

GENERAL DIRECTIONS TO THE ENTRANCE OF ST. MARKS RIVER.

The following directions are good in the daytime, with clear weather, for vessels of 7 feet or less draft, and lead to the anchorage at the mouth of **St. Marks River**. A stranger bound up the river should take a pilot.

Vessels coming from the southeastward, along shore, should keep in a depth of 18 feet. For a distance of 40 miles to the southeastward of **St. Marks River** entrance the 18-foot curve extends along the coast at distances of 5 to 9 miles offshore. The white light tower at the entrance can be seen a distance of 8 or 9 miles on a clear day, and a vessel approaching from any direction should not shoal the water to less than 18 feet until the lighthouse is sighted and steered for.

Vessels coming from the westward should pass to the southward of **South Shoal** and **Ocklockonee Shoal**; a red can buoy is placed to the southward of each of these shoals. From **Ocklockonee Shoal** Sea buoy a **N. $\frac{1}{2}$ W.** course will lead directly for **St. Marks Lighthouse** and to the Sea buoy at the river entrance. **Ocklockonee Shoal** Sea buoy is **E.** by **S.** and distant $9\frac{1}{4}$ miles from **Lighthouse Point**, the western point of Apalachee Bay. The shoal is the easternmost of the shoals which make off from the point and has a least depth of 3 feet on it.

*Shown on chart 181, scale $\frac{1}{80,000}$, price \$0.50.

ST. GEORGE SOUND.

As soon as *St. Marks Lighthouse* is made, and the vessel is to the eastward of Ocklockonee Shoal, bring the lighthouse to bear **N. $\frac{3}{4}$ W.** and steer for it on this bearing. When up to the Sea buoy, which is a black and white perpendicularly striped can, leave it on the port hand and steer so as to leave red nun buoy No. 2 on the starboard hand. From the latter buoy steer **NNW. $\frac{1}{2}$ W.** for red nun buoy No. 4, which is left on the starboard hand. (There is good anchorage in the channel between buoys Nos. 2 and 4.) From red nun buoy No. 4, steer about **N.** by **W. $\frac{1}{4}$ W.** and leave red nun buoy No. 6 on the starboard hand. Anchor to the northward or northeastward of this buoy. If bound farther up the river take a pilot.

ALLIGATOR HARBOR

is a shallow, unimportant body of water 39 miles **NE.** by **E.** from Cape St. George Lighthouse; the harbor is formed by a long, narrow spit of land which extends to the westward from **Lighthouse Point**, the southeastern point of St. James Island, and the numerous shoals which lie off the south shore of St. James Island. There is a narrow channel with a depth of 7 feet into the harbor, but, as it is not marked, a stranger should not attempt to enter. The post village of **St. Teresa** is at the western end of the harbor; it is a summer resort, and during the season small yachts and fishermen frequent the harbor.

ST. GEORGE SOUND AND APALACHICOLA BAY.*

These names are applied to parts of the large body of water which extends about 40 miles along the coast between Apalachee Bay and Cape San Blas, and which is separated from the gulf by a chain of islands and reefs. At the western end of this body of water is another, extending in a general westerly direction and known as **St. Vincent Sound**. The two principal tributaries emptying into the bay and sound are **Carrabelle** and **Apalachicola** rivers; the only towns on their shores are **Carrabelle** and **Apalachicola**. These waters are generally shallow and only navigated by tug boats, towing lumber lighters, and oystermen, the deepest draft of these vessels being about 7 feet and the average draft 4 feet. Lumber is the principal article of export; this is carried in foreign and coastwise vessels which load at anchorages inside the islands near **East Pass**, where there is an excellent harbor into which a draft (extreme) of 19 feet can be taken at high water with a smooth sea.

ST. GEORGE SOUND.

the easternmost of the two bodies of water, is about 26 miles long and has an average width of about $3\frac{1}{2}$ miles. Extensive shoals lie in the sound but a depth of 12 feet can be carried from its eastern to its western end through the channels which lead between the shoals. This sound can be entered from the gulf through several channels, only one of which is generally used; this is known as **East Pass**. **Duer Channel**, which is the eastern entrance to the sound, has an uncertain depth and is not marked; it should not be used by a stranger. Local fishermen sometimes enter the sound through the shoals close to the eastern end of **Dog Island**.

East Pass is just to the westward of **Dog Island** and 23 miles to the eastward of **St. George Lighthouse**. The channel of this pass leads between shoals which extend 2 miles offshore, but is well marked by buoys and a range of lights—**Crooked River Range** (see table, page 12); this pass is the entrance to the anchorages where vessels load lumber from **Apalachicola** and **Carrabelle**. A draft of $18\frac{1}{2}$ feet can be taken through the pass at high water but this requires local knowledge; a stranger of 15 feet draft can easily enter by following the buoys and the range. Inside of **East Pass** there are several excellent anchorages where vessels can load and ride out any gale in safety. These anchorages are known as **Apalachicola Harbor**. The **Swash Channel** leads from buoy No. 1 in a **WNW.** direction into the sound; it is good for a draft of 12 feet.

Carrabelle, a small town on the north shore of the sound and on the east shore at the mouth of the **Carrabelle River**, ships some lumber which is taken to the shipping in lighters towed by the tugs owned by the saw-mills. The town is of small importance; it is entered by a railroad and has a daily steamer to **Apalachicola**. A narrow, crooked channel with a depth of about 8 feet leads from the sound into the river, but it is not safe for strangers.

APALACHICOLA BAY

is just to the westward of **St. George Sound** and is separated from the latter by a line of shoals, known as the "**Bulkhead**," which extends in a northerly and southerly direction and through which there is a dredged cut 100 feet wide and 8 feet deep and also a natural channel with a depth of 5 feet; these channels are marked by beacons and buoys and can be readily followed by a stranger. The bay is generally shallow and has numerous

*Shown on charts 182, 183, scale $\frac{1}{80,000}$, price of each \$0.50.

oyster bars, which are being worked by Apalachicola parties, but the channels are well marked by buoys and, in daylight, with clear weather, can be readily followed to a good anchorage behind **St. George Island** or to Apalachicola.

West Pass, the principal entrance from the gulf into Apalachicola Bay, is well marked by buoys and has a depth of 11 feet in the channel over the bar. The channel leads through shoals that extend about 3 miles in a southerly direction from **St. Vincent** and **Sand** islands. The buoy marking the entrance is $11\frac{1}{2}$ miles **ENE. $\frac{1}{2}$ E.** from Cape San Blas buoy and 5 miles **W. $\frac{1}{2}$ N.** from **Cape St. George Lighthouse** (see table, page 12). This pass is seldom used except by local craft; all the larger vessels coming to Apalachicola for lumber enter by the **East Pass**.

Apalachicola River is the principal tributary entering the bay from the northward; the river is navigable for steamers of 3 to 4 feet draft to Columbus, Ga., a distance of 360 miles.*

The town of **Apalachicola**, on the west bank of the river at its mouth, has a larger water-borne trade than any town between Tampa Bay and Pensacola. It ships considerable lumber in foreign and coastwise vessels and fish and oysters by the steamers running on the Apalachicola River. The approach to the town from the bay is through a dredged channel 100 feet wide and, at present, 1896, about 7 feet deep, but this depth is not permanent. Vessels entering **East Pass** to load have to enter and clear at the customhouse at Apalachicola and all the shipping business is done here. A steamer runs daily to the shipping at **East Pass** and to **Carrabelle**, connecting with the railroad at that point.

ST. VINCENT SOUND

is shallow and fit only for boats; it lies $7\frac{1}{2}$ miles to the eastward of Cape San Blas and just to the northward of **St. Vincent Island**. The sound is full of oyster reefs; it can be entered from Apalachicola Bay from the eastward or through **Indian Pass** from the westward. **Indian Pass** is not marked and has a narrow, shifting channel; it is used only by small fishing craft and should not be attempted by a stranger.

GENERAL INFORMATION.

Prominent features.—**Dog Island**, which is wooded at its eastern end, will show before any other land when approaching **East Pass**. The shipping at anchor will be seen over the western end of the island, which is low and bare. The eastern end of **St. George Island** is low and bare, but the rest of the island is wooded. At night **Crooked River Light** (see table, page 12) will be sighted while still outside the bar, but in the daytime the weather must be exceptionally clear for it to be seen; the buoys at the entrance will usually be seen before the lighthouse is distinguished. Approaching the entrance to **West Pass**, **Cape St. George Lighthouse** will be seen to the eastward. **St. Vincent Island**, which is on the north side of the pass, is wooded to the point. **Sand Island**, on the south side of the pass, is low and has only a few low, straggling trees. The bar buoy is a large nun and in clear weather can be easily seen 2 miles.

Anchorage.—The anchorage in **St. George Sound**, for vessels of over 14 feet draft, is in the cove just inside the western end of **Dog Island**; vessels discharging ballast anchor about 1 mile to the eastward of this anchorage. Vessels of 14 feet or less draft usually anchor north of the eastern end of **St. George Island** in about 16 feet of water. Vessels entering **West Pass** can anchor anywhere in the channel after passing inside of **Sand Island**. There is good anchorage for vessels of 8 feet draft about 1 mile to the southward of the beacon at the entrance to the dredged channel into Apalachicola River.

Quarantine.—The quarantine laws for the State of Florida govern the port of Apalachicola. (See Appendix I and National Quarantines, Appendix IV.) Vessels subject to visitation by the health officer are boarded inside of **Dog Island** at **East Pass**.

Pilots.—Regular licensed pilots will be found on or just inside the bar at **East Pass**. The pilot laws for the State of Florida are in force at this port. (See pilot laws and rates for pilotage, also harbor regulations for Apalachicola, Appendix I.) A vessel desiring a pilot for **West Pass** will have to notify the pilots beforehand. Vessels headed off by the wind can anchor in about 5 fathoms of water to the southward of the Outer buoy.

Towboats.—Vessels usually enter under sail, but tow out when loaded. The towboats belonging to the mills from which vessels load usually do the towing, but a towboat can be had by making signal, although a vessel may have to wait until one is disengaged.

Supplies.—Provisions and ship chandler's stores can be had at Apalachicola and are brought to the shipping by the daily steamer to **Carrabelle** or by the towboats towing lumber. Fresh water can be taken from the Apalachicola River near the town, at low water, during certain seasons of the year.

* Statute miles, estimated by river pilots.

Repairs.—There is one marine railway at Apalachicola which can take out a vessel 95 feet long and 7 feet draft, or 150 feet long and 4 feet draft.

Wind Signals of the United States Weather Bureau are displayed on the north shore of Apalachicola Bay near the western end of the town of Apalachicola, but these signals can not be seen by the shipping near East Pass. They are also displayed at Carrabelle.

Tides.—See table, page 21, and remarks on page 23.

Currents.—The tidal currents are influenced greatly by the force and direction of the winds, the flood and ebb setting in and out of East and West passes, at times, with an estimated velocity of 3 to 4 knots, and ordinarily with a velocity of about 1 knot.

SAILING DIRECTIONS, ST. GEORGE SOUND AND APALACHICOLA BAY.

The directions in sections 1, 1A, and 2 are good for a draft of 15 feet through East Pass. The directions in section 3 are good for a draft of 7 feet through the Bulkhead at low water. These directions should be used by strangers only in the daytime with clear weather.

1. Approaching from the Eastward.—From a position $\frac{1}{2}$ mile south of the red can buoy ("South Shoal," in white letters) off South Shoal, steer **WSW. $\frac{3}{4}$ W.** for $16\frac{1}{2}$ miles, keeping in not less than 4 fathoms of water. The Outer buoy (can, white and black perpendicular stripes), marking the entrance to East Pass, should be made a little on the starboard bow. When up to the buoy follow the directions given in section 2, following.

Remarks.—Deep draft vessels should approach East Pass with caution when there is any sea on; in a heavy sea a vessel should keep in at least 6 fathoms of water until sure of her position. Strangers should not pass to the northward of South Shoal Sea buoy.

1 A. Approaching from the Westward.—From the whistling buoy ("St. George," in white letters) which marks the shoal making to the southward from Cape St. George, steer **NE. $\frac{1}{4}$ E.** for $25\frac{1}{2}$ miles, keeping in not less than 4 fathoms. The Outer buoy (can, white and black perpendicular stripes) should be made a little on the port bow. When this buoy is made, haul up for it and follow the directions in section 2.

Remarks.—Care should be taken not to be set inshore, as shoals make off from St. George Island; there are 11-foot spots nearly 1 mile from the beach, and the soundings in the vicinity of the shoals are very irregular. A stranger should keep to the southward of Cape St. George Outer Shoal buoy. See remarks under section 1, preceding.

2. Entering East Pass to an Anchorage in St. George Sound.—From the Outer buoy, or with Crooked River Lighthouse bearing **NNW. $\frac{1}{2}$ W.**, steer for the lighthouse. Leave buoys Nos. 1 and 3 (can, black) 50 yards on the port hand and continue the course for the lighthouse till buoy No. 3 is about 700 yards astern; then haul to the eastward and follow the shore of Dog Island, giving it a berth of about 500 yards. Anchor about $\frac{3}{4}$ mile inside the point in about $3\frac{1}{2}$ fathoms of water.

Or, when 700 yards to the northward of buoy No. 3, vessels of less than 15 feet draft may steer **N. by E. $\frac{3}{4}$ E.** for about $2\frac{1}{2}$ miles and anchor off the mouth of the Carrabelle River in about 16 feet of water. The range beacons at the mouth of the river should bear about **N.**, distant a little over $\frac{1}{2}$ mile.

Or, when 700 yards to the northward of buoy No. 3, vessels of less than 15 feet draft may stand **WSW.** for about 4 miles and anchor, in 13 to 14 feet of water, when the eastern end of St. George Island bears about **E. by S.**

Remarks.—The channel of East Pass is narrow, the shoals on either side having over them in places only 5 feet of water. The tidal current usually sets across the shoals at an angle with the channel; great care, therefore, should be taken not to be set toward the shoals on either hand. Between buoys Nos. 1 and 3, it may be possible to pick up the white iron post that with Crooked River Lighthouse forms the range for entering East Pass. This range, when it can be seen, will greatly assist in keeping a vessel clear of the shoals.

3. *From East Pass to the Upper Anchorage off the mouth of Apalachicola River.*—Entering East Pass as directed in section 2, preceding, when about 500 yards to the northward of buoy No. 1 (can, black), steer **W. $\frac{3}{4}$ N.** and pass about 100 yards to the northward of buoy No. 5 (can, black). When this buoy is abeam change course to **WSW. $\frac{1}{2}$ W.** and leave buoy No. 7 (can, black) about 100 yards on the port hand.

Or, bring the northwestern point of Dog Island astern, bearing **NE.** by **E. $\frac{1}{2}$ E.**, and steer **SW.** by **W. $\frac{1}{2}$ W.**, leaving buoy No. 7 (can, black) about 100 yards on the port hand.

When buoy No. 7 bears **SE.** and is distant about 100 yards, steer **SW.** by **W. $\frac{1}{2}$ W.** heading for First Mid-channel buoy (black and white perpendicular stripes). Leaving this buoy close-to on either hand, continue the course until a black beacon bears **S.** by **E. $\frac{1}{2}$ E.** and is distant $\frac{3}{4}$ mile and the vessel is close to Second Mid-channel buoy. From this position steer **S.** by **W. $\frac{3}{4}$ W.**; on this course leave the black beacon about 300 yards on the port hand and keep Porter Bar beacon (painted red) directly ahead. Round Porter Bar beacon, leaving it about 100 yards on the starboard hand, and steer **W. $\frac{1}{2}$ S.** Having stood on the **W. $\frac{1}{2}$ S.** course about $2\frac{1}{4}$ miles, a cluster of 3 piles will be seen to the northwestward, distant about $\frac{1}{2}$ mile; steer for this cluster of piles and when near them bring the red and black beacons, which will be seen to the northwestward, in range. Steer for the beacons, keeping them in range, and when the black beacon (front beacon of the range) is about $\frac{1}{4}$ mile distant ahead and the depth of water is about 10 feet or more, steer **SW. $\frac{1}{2}$ W.** until the rear beacon (red) bears **N.**; then steer **W.** by **S.** leaving red buoy No. 8 about 100 yards on the starboard hand. Continue the **W.** by **S.** course and anchor in about 9 feet of water to the southward of black buoy No. 5.

Remarks.—The sound and bay are full of shoals and oyster bars, a description of which would only confuse a stranger. The channel, however, is well marked by buoys and beacons and with ordinary care a stranger of 7 feet or less draft should have no difficulty in passing from St. George Sound to Apalachicola Bay when the aids can be seen. The two beacons which form the range through the Bulkhead dredged channel must be kept on a close range, as the dredged channel is quite narrow; a sailing vessel requires a good fair wind to pass through this cut, as the current sometimes sets diagonally across it. When nearly up to the cluster of piles which is near the eastern entrance to the dredged channel, a couple of red buoys will be seen to the southward. These buoys mark the natural channel over the Bulkhead which has a depth of 5 feet. The **W. $\frac{1}{2}$ S.** course from Porter Bar beacon leads to the easternmost of these red buoys.

A draft of 7 feet can be taken up to the city of Apalachicola through the dredged channel, but for this local aid should be employed.

SAILING DIRECTIONS, APALACHICOLA BAY.

In the daytime with clear weather and smooth sea, the following directions are good for a draft of 10 feet at low water through West Pass to the Upper Anchorage. A stranger should not attempt to enter at night.

1. *Approaching from the Eastward.*—From a position $\frac{1}{2}$ mile to the westward of the red whistling buoy (marked "St. George") to the southward of Cape St. George Lighthouse, steer **NW. $\frac{3}{4}$ N.** for about 9 miles, when the northwest end of Sand Island will be abeam. When West Pass Bar buoy (nun, black and white perpendicular stripes) is sighted, keep it a little on the starboard bow until up with it; then follow the directions in section 2.

Remarks and dangers.—Cape St. George Shoals extend out nearly to the whistling buoy. The shoals are of varying depths and have as little as 4 feet on them in some places, and they rise abruptly from comparatively deep water. There is a channel inside the shoals close in to the lighthouse, but strangers should not attempt to pass to the northward of the buoy. The sailing line passes within less than 1 mile of a 10-foot spot, and a good lookout should be kept for breakers, as the lead gives little indication of shoal water.

1 A. *Approaching from the Westward.*—From the red can buoy (marked "San Blas") to the southward of Cape San Blas, steer **ENE. $\frac{1}{2}$ E.** for nearly $11\frac{1}{2}$ miles, when the southeast point of St. Vincent Island will bear **NE.** and the vessel should be up to West Pass Bar buoy (nun, black and white perpendicular stripes). Then follow the directions in section 2.

2. *Entering West Pass to the Upper Anchorage, off the mouth of Apalachicola River.*—Passing close to West Pass Bar buoy (black and white perpendicular stripes), steer so as to leave buoy No. 1 (can, black) about 50 yards on the port hand. When up to this buoy steer about **NE.** by **E.** $\frac{1}{4}$ **E.**, so as to pass midway between St. Vincent and Sand islands. Buoy No. 3 (can, black) should be made ahead. Leave it 50 yards on the port hand and steer **SE.** by **E.** $\frac{1}{4}$ **E.**, heading for buoy No. 2 (nun, red). When up to this buoy, which should be left on the starboard hand, change course to **NE.** and stand up for buoy No. 4 (nun, red). Leaving this buoy about 50 yards on the starboard hand, steer **NE.** $\frac{1}{4}$ **N.** for about $2\frac{1}{4}$ miles and anchor to the northeastward of Mid-channel buoy (black and white perpendicular stripes) in about 11 feet of water.

Remarks.—The shoalest part of the channel in West Pass is just inside of the Bar buoy, where there is 11 feet at low water. The channel is liable to change slightly and a bright lookout should be kept when going in. The shoals on the southern side of the channel rise abruptly and in several places are marked by breakers. Breakers are seen in places on the northern shoals also.

On the **SE.** by **E.** $\frac{1}{4}$ **E.** course the lighthouse wharf and boathouse will be seen on the starboard bow some time before buoy No. 2 is sighted. The sailing line passes close to the shoals lying to the northeastward and care should be taken, therefore, not to be set to the eastward. (See, also, remarks under section 3, page 61.)

ST. JOSEPHS BAY*

is the large bay lying north of Cape San Blas and separated from the gulf by the long, narrow strip of land which extends from the cape to the northward. The bay is $11\frac{1}{2}$ miles long in a general **N.** and **S.** direction and varies in width from $2\frac{1}{4}$ miles at its entrance to $5\frac{1}{2}$ miles at its widest part; it is one of the best harbors of refuge on the Gulf Coast and is easily entered in the daytime, in clear weather, but it is not marked by any aids that can be used at night. Good anchorage, in 4 to $5\frac{1}{2}$ fathoms, will be found anywhere in the bay except its southern end, which is shoal for a distance of $3\frac{1}{2}$ miles from the head.

The entrance, which lies between the mainland on the north and St. Josephs Point on the south, is somewhat obstructed by shoals, between which there are two channels. The **Main Channel** has a depth of 19 feet and is marked by buoys; it is about $\frac{1}{2}$ mile wide. The **Swash Channel** has a depth of 15 feet and leads along St. Josephs Point at a distance of a little over $\frac{1}{2}$ mile; this channel is not marked but is easily entered by vessels of less than 12 feet draft, keeping at a distance of a little over $\frac{1}{2}$ mile from the beach while rounding St. Josephs Point.

There are no settlements on the shores of the bay and it is entered only for an anchorage; fishing vessels anchor just to the eastward and inside of St. Josephs Point in $4\frac{1}{2}$ to $5\frac{1}{2}$ fathoms of water.

Cape San Blas is 17 miles **W.** by **N.** from Cape St. George Lighthouse. The point of the cape is low and wooded, and is washing away; the ruins of an old light tower are now seen in the water over $\frac{1}{2}$ mile from the beach. The lighthouse erected on the cape in 1885 has been undermined by the sea and is being removed to **Blacks Island**, a small island in St. Josephs Bay. The narrow strip of land extending to the northward from the cape and terminating at St. Josephs Point, is a succession of low sand hills wooded in places and showing a white sand beach when seen from seaward. The shoals which extend to the southward from Cape San Blas make it dangerous for deep draft vessels, especially in a heavy sea, to approach the cape from the southward or southwestward closer than 11 miles. There is a swash channel, with a depth of about 8 feet, about 1 mile from the cape and vessels of less than 7 feet draft use this channel for rounding the cape in smooth weather.

GENERAL DIRECTIONS, ST. JOSEPHS BAY.

The Bar buoy is 3 miles **WNW.** $\frac{1}{2}$ **W.** from the northern end of St. Josephs Point. The shore from Cape San Blas nearly up to St. Josephs Point can be approached to within $\frac{1}{2}$ mile with 4 fathoms of water, but a shoal extends about $2\frac{1}{4}$ miles in a westerly direction and about 1 mile in a northerly direction from St. Josephs Point. Approaching from the westward, the shore should be given a berth of 3 miles to avoid the shoal off **St. Andrews Point**; this shoal is locally known as **Bell Shoal**.

Vessels of over 12 feet draft should make the Bar buoy, a black and white perpendicularly striped can; leaving this buoy close-to on either hand, steer about **NE.** $\frac{1}{4}$ **E.** until up to the Turn buoy (red, nun); leave this buoy on the starboard hand and steer about **SE.**; leave Middle Ground buoy (red, nun) about $\frac{1}{2}$ mile on the starboard hand and continue the **SE.**

course until the northern end of St. Josephs Point bears about **SW.** by **W.**; then steer **SW.** and anchor in the cove just inside the point. Or, stand into the bay and anchor at discretion.

Vessels of less than 12 feet draft can follow the shore from Cape San Blas and round St. Josephs Point at a distance of $\frac{1}{4}$ mile. This is known as the Swash Channel; on a clear night the shore can easily be followed at the above-mentioned distance.

ST. ANDREWS BAY *

is a large, irregularly shaped body of water lying about 32 miles to the northwestward of Cape San Blas; it is an excellent harbor and anchorage, but is seldom visited by other than local vessels and fishermen. There are two entrances to the bay from the gulf; the easternmost, known locally as the **Main Channel**, or **East Pass**, is marked by buoys and is good, it is claimed, for a depth of 14 feet; it lies 27 miles **NW.** $\frac{1}{4}$ **N.** from Cape San Blas Lighthouse and 87 miles **E.** $\frac{1}{2}$ **S.** from the whistling buoy off Pensacola. The other entrance, known locally as **West Pass**, is 3 miles to the northwestward of East Pass and just to the westward of **Hurricane Island**, a low, bare sand island that was formerly part of the peninsula to the westward; in 1896 this island looked as if it were being washed away. West Pass, which, although not marked, is generally used by local vessels, is said to have a depth of 12 feet in the channel over the bar. The depths over the bars at East and West passes are liable to change.

Inside the entrances are extensive shoals with channels between; in one of these the depth is about 15 feet; above these shoals depths of $3\frac{1}{4}$ to 8 fathoms can be taken in a good, broad channel through the bay and into its three arms. The deepest draft of the vessels now entering is 12 feet, but the usual draft of the vessels trading here is 6 to 7 feet. There are no aids other than the buoys in the **Main Channel**, and there are no licensed pilots; as the buoys are liable to be displaced by heavy gales, strangers of 7 feet draft or over should employ some one familiar with the locality to pilot them in.

St. Andrews Bay is a small town on the north shore of the bay and the most important in this vicinity; it has a little trade in fish, and a depth of 8 to 13 feet is found alongside the wharves. The steamer on the route between Mobile and Carrabelle, when she is running, makes a landing at the town. Water can be obtained, but must be brought down to the wharves in barrels from pumps.

East Bay extends in a general **ESE.** direction for about 18 miles from St. Andrews Bay; it is from $\frac{1}{4}$ to $2\frac{1}{4}$ miles wide and has a channel depth of $3\frac{1}{4}$ to 7 fathoms for a distance of 9 miles, while a depth of 12 feet can be taken about 15 miles up the bay. There are a number of settlements and post offices on the shores of the bay; **Wetappo**, which is near the head, can be reached by vessels of 6 feet draft.

North Bay extends in a northeasterly direction from the northern end of St. Andrews Bay and is from $\frac{1}{4}$ to $1\frac{1}{4}$ miles wide. A depth of 12 feet can be carried about 5 miles up the bay and about 7 feet to **Bay Head**, a village at the head of the bay.

West Bay extends in a northwesterly direction from the northern end of St. Andrews Bay; it is about 8 miles long and has a general width of 2 miles. A depth of 12 feet can be taken about 5 miles up the bay and 8 feet to near its head. **West Bay Head** is the local name of a small settlement near the head of the bay.

Prominent features.—Approaching the entrance from seaward, a group of four tall pines, standing about $4\frac{1}{4}$ miles to the northwestward of the **Main Channel** entrance, will show conspicuously; these trees are 70 to 100 feet high and look like tall umbrellas.

Anchorage.—Small vessels and fishermen frequently anchor just to the northward of **Hurricane Island**, in 8 feet of water, where they are sheltered from the sea in any gale. The best anchorage, in from $4\frac{1}{4}$ to $6\frac{1}{4}$ fathoms, is abreast the town of St. Andrews Bay, between **Buena Vista** and **Dyers** points; the holding ground here is good and the shelter excellent. The bottom in the bay below the town of St. Andrews Bay is generally hard sand and poor holding ground.

Quarantine.—When found necessary a quarantine is established, and a schooner anchored near the passes from which the health officer boards incoming vessels. (See, also, quarantine laws, State of Florida, Appendix I, and National Quarantines, Appendix IV.)

Prevailing Winds.—In summer the breeze is off the land at night and from sea in the daytime; in winter the winds are variable, the strongest gales blowing from the northward. Northers are frequent during some months; the only effect they have is to lower the water in the bay and set it out through the passes.

Tides.—Winds affect the tides so greatly that the height and time of tides can not be depended on. (See table, page 21, and remarks on page 23.)

* Shown on chart 134, scale $\frac{1}{80,000}$, price \$0.50. In 1896 the entrance to St. Andrews Bay had changed so much as not to be recognized by the chart.

ST. ANDREWS BAY—SAILING DIRECTIONS.

GENERAL DIRECTIONS, ST. ANDREWS BAY.

These directions are good for vessels of 7 feet draft; a vessel of greater draft should employ a pilot.

To Enter by the Main Channel.—Coming from the Eastward.—A **NNW. $\frac{3}{4}$ W.** course from Cape San Blas Outer Shoal buoy continued for $32\frac{1}{2}$ miles should lead to St. Andrews Bay Entrance buoy. Vessels approaching from the eastward should keep in 4 fathoms of water, so as to avoid a shoal which is about 10 miles to the eastward of the Entrance buoy; it has 6 feet of water at its outer end and extends 1 mile offshore.

Coming from the Westward.—Keep in 4 fathoms of water, and steer about **SE.** by **E.** until the Entrance buoy is made; then steer for this buoy.

From the Entrance buoy steer about **NE.**, leaving a black and white perpendicularly striped nun buoy on the starboard hand and a black can buoy on the port hand. Round the latter buoy and steer about **NW.**; on this course leave a red nun buoy on the starboard hand and a black can buoy on the port hand and head for a black and white perpendicularly striped nun buoy. When close to the latter buoy, steer about **WSW. $\frac{3}{4}$ W.** for a black and white perpendicularly striped can buoy; from the latter buoy, steer about **NW.** by **W. $\frac{1}{2}$ W.**, heading for a black and white perpendicularly striped nun buoy. Leave the latter close-to on either hand and steer about **N. $\frac{1}{4}$ W.**; on this course two black can buoys should be passed and left on the port hand. The course from black can buoy No. 7 is about **NW.** by **W. $\frac{1}{2}$ W.**, care being taken to avoid a long spit which makes to the southward from the point at the easternmost wharf of the town of St. Andrews Bay. When the end of this wharf bears about **NE.**, steer **N.** and anchor $\frac{1}{4}$ mile from the beach, in 4 to 6 fathoms of water, soft bottom.

To Enter by West Pass.—Vessels of 7 feet draft may use this pass when the weather is clear and the water smooth. Keep in about 4 fathoms of water, and when the four tall umbrella-shaped pines (which are near the western side of the entrance and form the best landmark for a stranger) are about $2\frac{1}{4}$ miles distant, bearing **NW.**, look out from aloft for the channel which will show quite plainly among the shoals, the water on the shoals being much lighter in color. Follow the deeper water, taking care that the vessel is not run into a pocket among the shoals; when inside, stand to the westward, following the buoys; keep a lookout for, and avoid, the discolored shoal water.

Remarks.—There are no prominent landmarks except the four prominent, tall, umbrella-shaped pine trees near the western entrance, and a stranger should use the Main Channel if possible. The channels are shifting and the shores changing; a stranger should select smooth water and clear weather for entering, as the channels can then be readily seen. Vessels headed by the wind, or in a gale of wind, should run for St. Josephs Bay and anchor there until a favorable opportunity offers for entering St. Andrews Bay.

The currents in the bay and its entrances are very strong at times, and the best pilots will not attempt to beat in against the ebb current in a strong northerly wind.

CHOCTAWHATCHEE BAY*

is 25 miles long in a general E. and W. direction and has an average width of about $3\frac{1}{2}$ miles; its entrance from the gulf, known as East Pass, is 72 miles **NW.** by **W. $\frac{1}{4}$ W.** from Cape San Blas Lighthouse and 42 miles to the eastward of Pensacola entrance. At its western end, the bay is entered from Santa Rosa Sound through **The Narrows**; these waters form an inland passage to Pensacola Bay, through which a draft of about 4 feet can be taken. The western end of the bay, for a distance of 15 miles, has a depth of 3 to 7 fathoms, but in the eastern end the depths range from 9 to 18 feet. The shores of the bay and its tributaries are sparsely settled and communication is usually had by small sailboats.

East Pass is obstructed by a shifting bar through which there is a channel having a usual depth of about 5 feet; vessels can only enter when the sea is smooth, and, even then, local knowledge is necessary. A fisherman will come out over the bar to pilot a vessel in if the sea will permit; the vessel will generally have to wait some time outside, and in fine weather may anchor just outside of the bar. There is considerable lumber and timber shipped from Choctawhatchee Bay to Pensacola through Santa Rosa Sound.

* Shown on chart 135, scale $\frac{1}{80,000}$, price \$0.50.

GENERAL DIRECTIONS, EAST PASS, CHOCTAWHATCHEE BAY.

Coming from the eastward or westward, the beach can be followed at a distance of $\frac{1}{4}$ mile, but when approaching the entrance, which can not easily be distinguished unless it is close-to, a vessel should keep at least $\frac{1}{2}$ mile from the shore. In clear, smooth water the shoals are very distinctly marked and the deeper water of the channel can be easily seen; the channel, in 1896, favored the eastern side of the pass, but, as it is liable to shift during any heavy southerly gale, no certainty can be felt as to its direction, though a depth of from 4 to 6 feet will usually be found in the channel. A vessel of less than 4 feet draft, in the daytime, with smooth, clear water, can pick her way through the shoals by sight. The tidal currents through East Pass are strong and a sailing vessel requires a good fair breeze to stem them.

PENSACOLA BAY*

is one of the important harbors on the Gulf Coast of the United States; its entrance lies 106 miles **WNW.** $\frac{1}{4}$ **W.** from Cape San Blas and 39 $\frac{1}{2}$ miles **ENE.** $\frac{1}{4}$ **E.** from Mobile Bay entrance. The bay is about 12 $\frac{1}{2}$ miles long in a general **NE.** by **E.** and **SW.** by **W.** direction, and has an average width of about 2 $\frac{1}{2}$ miles. At its eastern end it is joined by Escambia Bay, a large, shallow body of water which makes to the northward, and by East Bay, a large, shallow body of water which makes to the eastward. Santa Rosa Sound is a narrow body of water which extends from the southern part of Pensacola Bay to the eastward along the coast for a distance of 24 miles, and then, by a narrow, shallow body of water called The Narrows, connects with Choctawhatchee Bay.

These connecting waters and their tributaries form water routes over which large quantities of lumber and timber are brought to Pensacola for shipment. Bituminous coal, mined in Alabama and brought by rail to Pensacola, is also shipped. As many as 50 large vessels can often be counted in port at one time. One of the important industries of the port is fishing; four car loads of fresh fish are sent by rail every day to different parts of the country.

The entrance to the bay is about $\frac{1}{4}$ mile wide and is obstructed by shoals and a bar through which there is a well-marked channel having a depth of 22 feet at low water, but this depth is said to be decreasing. Inside the entrance, Pensacola Bay has a channel depth of 4 $\frac{1}{2}$ to 6 $\frac{1}{2}$ fathoms up to the city of Pensacola and 3 $\frac{1}{2}$ fathoms to its junction with Escambia Bay and East Bay. The bay affords excellent shelter and anchorage and in the winter is frequently used as a harbor of refuge by coasting vessels.

The city of Pensacola is on the north shore of Pensacola Bay about 7 $\frac{1}{2}$ miles above the entrance; it is one of the important commercial cities on the Gulf Coast and its shipments of lumber in foreign vessels exceed those of any port on the gulf. The depth of water at the wharves ranges from 13 to 22 feet according to locality, but, as the bottom is soft mud, vessels when loading sometimes lie aground in the mud at low water. Besides the large number of vessels which come here for cargoes of lumber and coal, there is a line of steamers running to Habana, and other steamers occasionally stop at Pensacola for coal.

Town Point is on the south shore of Pensacola Bay opposite the city of Pensacola; it has a large shipyard and marine railway and repairs to all large vessels are made here.

Warrington is a small town on the north shore of the bay about 2 miles above the entrance. At the eastern end of the town is the United States Navy Yard. The depth alongside the wharf at Warrington is 12 feet, and alongside the docks at the navy yard 22 feet.

EAST BAY

extends about 8 $\frac{1}{2}$ miles to the eastward from the head of Pensacola Bay and is about 5 $\frac{1}{2}$ miles wide in a **N.** and **S.** direction; the entrance to the bay, between Garcon Point on the north and Red Fish Point on the south, is 2 $\frac{1}{2}$ miles wide. The bay has a general depth of 8 to 12 feet, but in the entrance the channel depth ranges from 14 to 24 feet; at its northern end it is entered by Blackwater Bay and Blackwater River, the latter being the approach to the towns of Milton and Bagdad. Blackwater Bay is nearly 5 miles long in a **N.** by **E.** $\frac{1}{4}$ **E.** direction and has a channel depth of 7 to 9 feet; at its head Blackwater River enters from the northwestward. The town of Bagdad is 2 $\frac{1}{2}$ miles above the mouth of Blackwater River, on its west bank, and the town of Milton about 1 $\frac{1}{2}$ miles above Bagdad, on the same side of the river. From 7 to 9 feet is the deepest draft that can be taken to Bagdad or Milton, depending on the stage of the tide. The channel through East Bay and into Blackwater Bay is marked by beacons, but a pilot is necessary for a stranger, and a towboat for sailing vessels of 7 feet draft or over, if bound into Blackwater River. Magnolia, about 8 miles above Milton, is considered

* Shown on chart 186, scale $\frac{1}{80,000}$ price \$0.50; the entrance is shown on charts 187, scale $\frac{1}{80,000}$ price \$0.50; and 480, scale $\frac{1}{80,000}$ price \$0.25.

PENSACOLA BAY AND TRIBUTARIES.

the head of navigation on the Blackwater River, although rafts and small boats pass above Milton; at the latter place lumber is loaded on lighters and towed to Pensacola for shipment. The railroad bridge at Milton has a draw 80 feet wide. East Bay River empties into the eastern end of East Bay; it is a shallow, unimportant stream.

ESCAMBIA BAY

is a large, shallow body of water making into the eastern end of Pensacola Bay from the northward; the bay is nearly 9 miles long in a general **NNW.** and **SSE.** direction, and is from $1\frac{1}{2}$ to 3 miles wide. A little over 5 miles above its entrance, the bay is crossed by a railroad bridge with a draw 80 feet wide, and for a distance of 4 miles below this bridge the channel depth ranges from 7 to 11 feet, while above the bridge a depth of 7 feet can be carried for 2 miles. Escambia River empties into the bay from the northwestward about $1\frac{1}{2}$ miles above the bridge. This river is navigable only for small craft of 3 feet or less draft; through it and its tributaries rafts of logs and timber are brought to Escambia and then towed to Pensacola for shipment. Ferry Pass is a small settlement about $1\frac{1}{2}$ miles above the mouth of the river. Escambia is a small town on the west shore of the bay about 1 mile above the railroad bridge; it can be reached by vessels of 6 feet draft. On the east shore, above the bridge, is the post village of Mulat.

SANTA ROSA SOUND

is the narrow body of water extending to the eastward from the southeastern part of Pensacola Bay for a distance of 24 miles, and just back of the narrow strip of beach known as Santa Rosa Island. At its eastern end the sound is joined by The Narrows, a narrow, shallow body of water about 9 miles long, which leads into Choctawhatchee Bay. A depth of over 15 feet can be taken through the sound for a distance of 13 miles from Pensacola Bay, but to the eastward of this there are numerous shoals and 5 feet is the deepest draft that can be taken through at high water into Choctawhatchee Bay. Mary Esther is a post village on the north shore of The Narrows, about 27 miles from Pensacola Bay. At the western end of the sound, off Deer Point, is the quarantine station; vessels entering Pensacola Bay are obliged to come here to obtain pratique.

BIG LAGOON

is a shallow, unimportant body of water about 5 miles long in an **E. by N.** and **W. by S.** direction and from $\frac{1}{2}$ to 1 mile wide. It is entered by a narrow slue, having a depth of 3 feet, to the northward of Fort McRae, and extends to the westward along the coast behind a low, narrow strip of beach through which the sea occasionally makes breaches, which, however, generally close again.

GENERAL INFORMATION.

Prominent features.—There are no natural landmarks that can be recognized by a stranger standing along the coast. Pensacola Lighthouse (see table, page 12) will be the first easily recognized mark. While to the eastward of the entrance, the masts of the shipping at anchor in the bay will be seen over Santa Rosa Island, and some of the buildings in the navy yard will be seen as the entrance is approached. The ranges can be easily picked up in clear weather, either in the daytime or at night (see table, page 12).

Channels.—The Main Channel, which is well marked by buoys and three ranges, has a depth of 22 feet on the bar at present (1896), but this depth is said to be decreasing. The deepest draft taken over the bar is 24 feet, but this requires high water and a smooth sea; if there is any swell on the bar, the deeper draft vessels have to wait for smooth water. After crossing the bar a least depth of 5 fathoms can be taken to abreast the city of Pensacola. The Swash Channel has a depth of about 10 feet, but is used only by small local vessels; it leads to the eastward of the Middle Ground in the entrance and close to the western end of Santa Rosa Island. Improvements are in progress to dredge a channel, with a proposed width of 300 feet and depth of 26 feet, across Caucus Shoal. This channel is $\frac{1}{2}$ mile to the westward of, and parallel with, the range of Pensacola Lighthouse and Bar beacon; it is not completed, but is marked by 2 beacons (each showing 2 white lights vertically) which are about $\frac{1}{2}$ mile to the westward of Pensacola Lighthouse. When completed, the dredged channel will lead from the deep water outside through Caucus Shoal and up to the Fort Barrancas Range.

Anchorage.—The anchorage for vessels is good anywhere in the bay except abreast the navy yard. The usual anchorage is abreast the city of Pensacola, where the holding ground is good and vessels can ride out any gale of wind. (See harbor regulations, Appendix I.)

Quarantine.—The quarantine station is on Santa Rosa Island, at the entrance to Santa Rosa Sound. All vessels entering the bay between May 1 and November 15 are required to stop off the quarantine station until boarded by the quarantine physician. During the remainder of the year certain vessels only are boarded. (See quarantine regulations, Appendix I, and National Quarantines, Appendix IV.)

Pilots.—There are licensed pilots for the port. In winter two pilot boats usually cruise outside the bar; in the summer season one pilot boat is usually anchored off the whistling buoy at the entrance and the other boat acts as relief. Pilotage is compulsory (see pilot laws, regulations, and rates, Appendix I). Vessels desiring a pilot and not having obtained one can anchor near the whistling buoy until boarded. Pilots for East Bay and for Escambia Bay can be had at Pensacola.

Towboats.—Towboats are used by all the deeper draft sailing vessels, but with a strong fair wind vessels of 18 feet draft sometimes sail in. Towboats usually cruise outside the bar; they can always be had at Pensacola for towing over the bar or up any of the bays.

Lines inside of which the "Rules of the Road" for harbors, rivers, and inland waters, etc., are to be followed:—"From Pensacola entrance whistling buoy $N. \frac{1}{4} W.$, a tangent to the east side of Fort Pickens, to the shore of Santa Rosa Island, and from the whistling buoy $NW. \frac{1}{4} W.$ to Fort McRee Range front light."

Supplies.—Bituminous coal for steamers can be had through chutes or from cars at the wharves in Pensacola, or from lighters in the stream or outside the bar. Water can be had through pipe and hose at the wharves at Pensacola, or from water boats in the bay. Provisions and ship chandler's stores can be obtained at Pensacola, and provisions can be had also at Warrington, Bagdad, and Milton.

Repairs.—At Town Point, opposite Pensacola, there is a marine railway capable of hauling out vessels of 1,400 registered tons; the draft when the cradle is down is 13 feet forward and 18 feet aft. By extending the cradle vessels of 260 to 270 feet in length can be hauled out. There is a sectional dock at Bagdad capable of lifting vessels of 300 tons and about 9 feet draft. There are good facilities for repairing hulls of wooden vessels at Town Point and Bagdad and, for small wooden vessels, at Milton. At Pensacola there are two machine shops where ordinary repairs to machinery of steamers can be made.

Wind Signals of the United States Weather Bureau are displayed from the post office building, corner of Palafox and Government streets; they show well to the shipping in the harbor.

United States Marine Hospital Service.—Medical attendance is furnished by a medical officer of the service. Seamen requiring long-continued hospital treatment are sent to the Marine Hospital, at Mobile, Ala. (See, also, Appendix IV.)

Winds.—Northerly average one a month during the winter; they, however, have no effect on the shipping at anchor. (See the remarks on page 24.)

Fogs.—There is considerable fog during February and March. Southerly winds bring it in and northerly winds clear it away.

Tides.—The tides are irregular, being, to a great degree, influenced by the force and direction of the wind. (See table, page 21, and remarks on page 23.)

Currents.—The currents set with considerable velocity over the bar at the entrance. On the Fort McRee (the western) Range both the flood and ebb set across the channel. Elsewhere, the currents follow the general direction of the channel.

SAILING DIRECTIONS, PENSACOLA BAY.

These directions are good, in clear weather and smooth water, either in the daytime or at night, for vessels of less than 17 feet draft. Vessels of 17 feet draft and over should employ a pilot. Sailing vessels require a strong fair wind to sail in on account of the current, which runs very strongly at times and sets diagonally across the channel in places.

1. **Approaching from the Eastward.**—From a position 12 miles S. of Cape San Blas, a $WNW.$ course made good for 110 miles will lead to the whistling buoy off the entrance.

Or, from the buoy off Cape San Blas, make good a $WNW. \frac{1}{4} W.$ course for 110 miles; this should lead to the whistling buoy off the entrance.

Or, from the entrance to St. Andrews Bay, follow the shore, giving it a berth of about $2\frac{1}{2}$ miles until up to the whistling buoy at the entrance.

Remarks.—Cape San Blas is described on page 62. Deep draft vessels should give the cape a berth of 12 miles in heavy weather. The shore between Pensacola Bay and St. Andrews Bay is comparatively bold-to and 10 fathoms of water will be found, in many places, within 1 mile of the beach. Santa Rosa Island, which extends along the coast for a distance of 41 miles to the eastward of the entrance to Pensacola Bay, shows a white sand beach and sand hills, with scattered clusters of trees and bushes. To the eastward of Santa Rosa Island, the shore is generally wooded to within a short distance of the beach. As the entrance to Pensacola Bay is approached, the masts of the ships at anchor at the quarantine station, during the season when quaran-

time is in force, will be seen over Santa Rosa Island, and next the lighthouse and tall brick chimney at the navy yard will show conspicuously. A vessel approaching the shore at night, or in thick weather, should take frequent soundings, and should not shoal the depth of water to less than 12 fathoms before sighting the lighthouse.

1 A. *Approaching from the Southward or Southwestward.*—Vessels approaching from the southward should, when near Latitude $30^{\circ} 00' N.$, stand **N. $\frac{1}{2}$ W.** on the meridian of $87^{\circ} 17' W.$ until Pensacola Lighthouse is made; then bring the lighthouse on the bearing **NNW.** and steer for it; this course will lead to the whistling buoy off the entrance.

Or, from the light-vessel off South Pass, at the entrance to the Mississippi River, a **NE. $\frac{1}{2}$ E.** course made good for $123\frac{1}{2}$ miles will lead to the whistling buoy off the entrance.

Or, from a position 2 miles to the southward of the whistling buoy off Mobile Bay entrance, an **ENE. $\frac{1}{2}$ E.** course made good for $39\frac{1}{2}$ miles will lead to the southward of the whistling buoy off the entrance to Pensacola Bay.

Remarks.—Standing in for the coast, vessels not sure of their reckoning can easily tell by the appearance of the land, when about 4 miles off, whether they are to the eastward or to the westward of the entrance to Pensacola Bay. To the eastward, for a distance of 40 miles, Santa Rosa Island presents a white sand beach and low, white sand hills with scattered clusters of trees and bushes; back of this, on the mainland, are thick woods. To the westward of the entrance, for a distance of 40 miles, the shore is low and thickly wooded nearly to the water, showing no breaks and very few hillocks. The lead, too, will indicate whether a vessel is east or west of the entrance. The 10-fathom curve approaches the coast very much more closely to the eastward than it does to the westward; so that, if soundings of 10 fathoms or less are obtained while the vessel is more than 8 miles from the beach, it is an indication that she is off the entrance or to the westward of it. This holds good for a distance of 60 miles on either side of the entrance to Pensacola Bay. To insure a depth of 7 fathoms or more deep draft vessels should give the shore to the westward of the entrance a berth of 5 miles; a depth of 4 fathoms will be found $1\frac{1}{2}$ miles from the beach. (See, also, the remarks under section 1.)

2. *Entering and to the Anchorage off Pensacola.*—Steer for the whistling buoy at the entrance; leave it on either hand and steer **NNW.**, keeping a white beacon with black sides in range with Pensacola Lighthouse. When up to the Inner Bar buoy (can, white and black perpendicular stripes) leave it close-to on the starboard hand and steer **WNW.**, keeping the red beacon open a very little to the left of the white beacon, which will be ahead. Continue on this course, passing between a red bell buoy on the starboard hand and a black can buoy on the port hand, until up to black can buoy No. 5; leave this buoy on the port hand and steer **N. $\frac{1}{2}$ E.**, keeping a red pyramidal beacon and a white pyramidal beacon in range ahead.

Having stood on the **N. $\frac{1}{2}$ E.** course for 1 mile steer **ENE. $\frac{1}{2}$ E.**, giving the northern point of Santa Rosa Island a berth of at least 250 yards; after having stood **ENE. $\frac{1}{2}$ E.** for about $\frac{1}{2}$ mile, and the small landing on the north shore of Santa Rosa Island bears abeam, steer **E. $\frac{1}{2}$ N.** When the tall derrick at the navy yard bears **NNW.**, steer **NE. $\frac{1}{4}$ N.** and anchor off the city in $4\frac{1}{2}$ to 5 fathoms of water.

At night.—When in 7 fathoms of water bring Pensacola Light to bear **NNW.** and steer for it, keeping the white beacon light directly under and in range with the main light; pass close to the whistling buoy and continue on the range. When a little over 1 mile inside the whistling buoy, look out for the Fort McRee Range (front light white, rear light red), which will be broad off the port bow. When these two lights are in range, or nearly so, look out for Inner Bar buoy, so as not to strike it. Stand in on the Fort McRee Range, taking care to leave the bell buoy (which can usually be heard) on the starboard hand, and when past the bell buoy look out for the Fort Barrancas Range (front light white, rear light red), which will show to the eastward of Pensacola Light. Continue on the Fort McRee range until the vessel is fair on the Fort Barrancas Range; stand on the latter range for 1 mile and then steer **ENE. $\frac{1}{2}$ E.**, taking care not to be set to the southward and that the northern point of Santa Rosa Island is left at least 250 yards on the starboard hand. Continue on the **ENE. $\frac{1}{2}$ E.** course for about $\frac{1}{2}$ mile and then steer **E. $\frac{1}{2}$ N.** for $1\frac{1}{2}$ miles; the vessel should then be in mid-channel between the navy yard and Santa Rosa Island. From this position steer **NE. $\frac{1}{4}$ N.** and anchor when abreast the city in $4\frac{1}{2}$ to 5 fathoms of water.

Remarks.—When there is a strong southerly wind and an ebb current a confused sea, bad for small vessels, makes on the bar. Standing on the **NNW.** course for Pensacola Lighthouse, Inner Bar buoy (can, white and black perpendicular stripes) should be ahead. At night care must be taken not to run into any of the buoys, which lie close to the range lines; in the daytime, with clear weather, the buoys are close enough to one another to be readily seen.

The **WNW.** course (on the **Fort McRee Range**) from the Inner Bar buoy will lead so as to pass between a red bell buoy and black can buoy, and a black can buoy should be ahead. The tidal currents set diagonally across the sailing line on the **WNW.** course and care must be taken not to be set off the range. Black can buoy No. 5, which is ahead on this course, should be left 50 yards on the port hand.

On the **N. $\frac{1}{2}$ E.** course three red buoys, marking the western edge of the **Middle Ground**, will be left on the starboard hand; black can buoy No. 7 will be ahead; when this buoy is about 400 yards distant the course should be changed to **ENE. $\frac{1}{2}$ E.**

On the **ENE. $\frac{1}{2}$ E.** course, care should be taken, when the current is running ebb, not to be set to the southward; the northern point of Santa Rosa Island must be given a good berth to clear the shoals making off to the westward from it. A small dock (landing) will be seen on the north shore of Santa Rosa Island abreast of Fort Pickens, and the town of Warrington and the United States Navy Yard will be seen on the port bow.

The **E. $\frac{1}{2}$ N.** course heads for the quarantine station, which will be from 5 to 6 miles ahead. The shipping off the city of Pensacola will be seen to the northeastward and the city will open out from behind the navy yard. The harbor master has control of the anchorage and berthing of vessels (see Appendix I).

2 A. To the Quarantine Anchorage.—*For vessels of less than 15 feet draft.*—Follow the directions in section 2 until the large derrick at the navy yard bears **NNW.** and is distant $\frac{2}{3}$ mile. From this position steer **ENE. $\frac{1}{2}$ E.** for 3 miles and then steer **ESE. $\frac{1}{2}$ E.** Leave Deer Point $\frac{1}{2}$ mile on the port hand and steer about **E. $\frac{1}{2}$ N.** for the quarantine station. Anchor to the northward or northwestward of the station in about 4 fathoms of water.

Remarks.—On the **ENE. $\frac{1}{2}$ E.** course **Deer Point**, a low, bare, sand spit on the north side of the entrance to Santa Rosa Sound, will be on the starboard bow. On the **ESE. $\frac{1}{2}$ E.** course care must be taken not to approach Deer Point too closely, as a long shoal makes to the southward from the point. A yellow buoy is usually in place nearly $\frac{1}{2}$ mile to the southwestward of Deer Point; this buoy can be left close to on either hand.

3. From Pensacola to Milton.—*In the daytime, for vessels of 6 feet or less draft.*—From a position about $\frac{2}{3}$ mile to the southward of the wharves at Pensacola, steer **ENE. $\frac{3}{4}$ E.** Pass about $\frac{1}{4}$ mile to the southward of a black can buoy off Garcon Point and keep a large red beacon (lighted) on the port bow. When this beacon bears a little to the eastward of **N.**, steer about **N.**, leaving the beacon 100 yards on the starboard hand and keeping a red beacon (Middle beacon) ahead. When nearly up to the latter beacon leave it 100 yards on the starboard hand and steer **N. $\frac{1}{2}$ E.**, heading for a red beacon (lighted) which is nearly 3 miles distant from Middle beacon. Leave the lighted beacon about 50 yards on the starboard hand and steer about **N.** by **E. $\frac{1}{4}$ E.**; on this course a large sawmill on Bay Point should be a little on the port bow and the course should lead so as to leave the end of the lumber dock at the sawmill about 50 yards on the port hand.

Round the point with a starboard helm, keeping about 50 yards from the lumber docks and log booms, and steer about **NW. $\frac{1}{2}$ W.** for the point which will be on the port bow and a little over $\frac{1}{2}$ mile farther up the river. As this point is approached leave it about 60 yards on the port hand and then steer about **N.** by **W. $\frac{1}{4}$ W.**, keeping the end of the first small wharf, which is on the north side of the point, over the stern while on this course. Stand straight in for the entrance between the low marshy islands on both sides and favor the shore on the starboard hand. When fair in the entrance and about 50 yards from the wooded shore on the starboard hand, steer a little more to the westward, so as not to enter the creek which will be right ahead. The course is about **NW.** by **W.**, leaving this creek (which can be recognized by an old dock a short distance above its mouth) on the starboard hand. Follow the bank on the starboard hand, giving it a berth of about 50 yards until nearly up to the sawmill which will be seen on the port bow; then haul over toward the port bank and when abreast of the log boom, on the port hand, stand up the river, keeping in mid-stream. Anchor in mid-river below the railroad bridge at Milton, or, if bound to the sawmill above the bridge, pass through the draw and continue a mid-river course, anchoring above the bridge.

PERDIDO AND MOBILE BAYS.

PERDIDO BAY*

empties into the Gulf of Mexico through Bayou St. John and a narrow pass located 13 miles to the westward of Pensacola entrance and 26½ miles to the eastward of Sand Island Lighthouse at Mobile Bay entrance. The bay is an irregularly shaped, shallow body of water, extending about 12 miles in a northeasterly direction, and at its head is entered by Perdido River, the bay and river forming part of the boundary between the states of Florida and Alabama. Millview, which is near the head of Perdido Bay, has two large lumber mills which are supplied by logs from the Perdido River; the lumber is shipped from Millview to Pensacola by rail. This is the only industry in this vicinity.

Bay La Launch and Wolf Bay extend to the westward and northward from the western end of Perdido Bay; they are of no importance, but at the head of Wolf Bay is the post village of Swift. The post village of Josephine is situated on the north shore, at the entrance to Bay La Launch.

The entrance from the gulf, between Florida Point on the east and Alabama Point on the west, is obstructed by a shifting bar which extends nearly ½ mile to seaward and over which there is a channel varying in depth from 5½ to 12 feet, according to circumstances. In June, 1895, there was 9 feet in this channel. Occasionally a fisherman of 4 to 5 feet draft will cross the bar, but as there are no aids except local ones it requires a practiced eye to follow the channel among the shoals. In strong southerly winds the sea makes the bar impassable; strangers should never attempt to enter before sounding out the channel. Inside the entrance are numerous shoals, and these are continually shifted by the strong tidal currents which are caused principally by the winds. A vessel that crosses the bar and passes through the shoals in Bayou St. John can easily carry 7 feet of water to Millview and 10 feet to Josephine and, through Bay La Launch, into Wolf Bay.

Sailing directions that would be of use to a stranger can not be given; it is hard to distinguish the entrance at a distance of 1 mile from shore, and the channel over the bar is liable to shift at any time.

MOBILE BAY†

is 39 miles to the westward of Pensacola entrance and 91 miles to the northeastward of the South Pass of the Mississippi River; it is about 27 miles long in a N. and S. direction and has an average width of about 8 miles for the greater part of its length. The southern part of the bay, extending about 14 miles to the eastward of the entrance, is known as Bon Secours Bay. Mobile Bay is the approach to the city of Mobile and to the Alabama and Tombigbee rivers, the two most important rivers in the State of Alabama. The port of Mobile has a large foreign and coastwise trade; the principal articles shipped are cotton, lumber, naval stores, rails, ice, coal, and provisions. The lower part of the bay is a good anchorage and also an excellent harbor of refuge, as it is one of the easiest harbors on the Gulf Coast to enter with a southerly wind.

The entrance, between Mobile Point on the east and the eastern end of Dauphin Island on the west, is 2½ miles wide, but there are a number of islands and extensive shoals lying to the southward, between which a number of channels lead into the bay. The Main Ship Channel, which is marked by Sand Island Lighthouse (see table, page 12), is the one generally used; it leads between Dixie and Sand islands, is from ¾ to 1 mile wide, and has a depth of 22 feet on the bar. The deepest draft that has been taken out over the bar is 24½ feet. Inside the bar, the depths range from 5 to 11 fathoms until up to the anchorage, above which the general depth in the bay is about 12 feet; there is, however, a dredged channel from the Lower Fleet to the city of Mobile which at present (1896) has a depth of 23 feet. There are several summer resorts on the eastern shore between Great Point Clear and the head of the bay; they all have steamboat communication with Mobile. A draft of 12 feet can be taken to Montrose and 7 feet to Howard (post office name, Daphne), Battles, and Point Clear.

Bon Secours Bay has a general depth of 7 to 15 feet and is of no importance, except for its oysters. Bon Secours is a village at the head of the bay. Emptying into Bon Secours Bay from the northward is Weeks Bay, a shallow body of water navigable for boats of about 3 feet draft. The southwestern part of Mobile Bay is connected with Mississippi Sound by a number of shallow, narrow passes, through the deeper of which a draft of about 6 feet can be taken at high water.

The city of Mobile is at the head of the bay, on the western shore of the mouth of the Mobile River; it is one of the important commercial cities on the Gulf Coast. The depth of water alongside the wharves of the city ranges from 12 to 23 feet, and the facilities for loading and unloading vessels are good. The deepest draft of the vessels leaving the port is about 23 feet. Besides the steamers plying on the bay and the rivers leading into it, there are steamers running regularly from Mobile to Tampa, Habana, Apalachicola, some of the Mexican and Central American ports, and, during the cotton season, to Liverpool.

* Shown on chart 187, scale $\frac{1}{80,000}$, price \$0.50.

† Shown on chart 188, scale $\frac{1}{80,000}$, price \$0.50; the entrance is shown also on charts 187, 189, scale $\frac{1}{80,000}$, price of each \$0.50.

MOBILE RIVER

empties into the head of Mobile Bay near the western shore; it is one of the mouths of the Alabama and Tombigbee rivers and is about 38 miles long. Abreast the city of Mobile and up to Chickasaw Creek the channel has a depth of 23 to 24 feet, but above this the depths range to less than 13 feet. There are no towns of importance above Mobile; Mount Vernon is a village about 81 miles above the city. The deepest draft of the steamers navigating the river is about 13 feet.

APALACHEE RIVER

empties into the head of the bay near the eastern shore; it is one of the mouths of the Alabama and Tombigbee rivers. Only a draft of $4\frac{1}{2}$ feet can be taken into the river directly from the bay, but by a roundabout route leading up the Mobile River, down the Spanish River, up the Tensaw River, and then into the Apalachee River, $12\frac{1}{2}$ feet can be taken to Blakely and Stockton, the two principal landings on the river. The vessels navigating the river are scow-built steamers of 4 feet draft.

ALABAMA RIVER.

From the city of Mobile to the junction of the Coosa and Talapoosa rivers, the distance, estimated by the captains of river steamers, is about 400 statute miles. Steamers run regularly from Mobile to Montgomery, an estimated distance of 389 miles (statute), stopping at numerous intermediate landings for passengers and freight; there is also a large rafting business done on the river. The deepest draft of the steamers trading on the river is 6 feet, but during low stages of water only 4 feet can be taken to Montgomery. Three bridges cross the river below Montgomery, the first about 15 miles above Mobile, the second at Selma, 308 miles above Mobile, the third about 7 miles above Selma. The bridge at Selma is built on a bend of the river and during high water steamers have to use lines to pass through the draw. The estimated width of the draws in these bridges is 110 feet. Improvements are in progress by the United States Government to obtain a low water depth of 6 feet to Montgomery. Freshets usually occur in the river from March to June.

TOMBIGBEE RIVER

enters the Mobile River at its junction with the Alabama River, about 38 miles above the city of Mobile. The river and its principal tributary, the Black Warrior River, are being improved by the United States Government to obtain a low water depth of 6 feet. At present (1896) the river is navigable for a distance of 243 miles,* to Demopolis, for steamers of 4 feet draft during the greater part of the year, and, when the river is high, for a draft of 4 feet to Pickensville, about 388 miles* above the city of Mobile. When the improvements are finished the river will be the outlet for the coal and iron mined in the region drained by the Black Warrior River. Only steamboats of 6 feet (extreme) draft and small vessels carrying cord wood navigate the river. Fairford, 3 miles above the mouth of the river, has some trade in lumber, and steam and sailing vessels of 13 feet draft go there for cargoes. Sailing vessels require the assistance of towboats. Freshets usually occur in the river from March to June. Three bridges cross the river; one at Jackson, 110 miles,* one at McDowell, 239 miles,* above the city of Mobile, and the third at Jones Bluff; the estimated width of the draws is 75 to 80 feet.

GENERAL INFORMATION.

Prominent features.—There are no prominent natural landmarks at the entrance to Mobile Bay. Sand Island Lighthouse is the most conspicuous mark when approaching from seaward, and on the eastern point, at the entrance, is Mobile Point Lighthouse (see table, page 12); the latter is on the southwestern lunette of Fort Morgan and forms a prominent mark when well up to the entrance. The dredged channel from the Lower Fleet to the city of Mobile is marked by cluster pile beacons and two lighthouses; a number of beacons on the starboard hand, going up, show white lights at night.

Channels.—The Main Ship Channel is the one generally used by all classes of vessels; it has a depth of 23 feet over the bar and is well marked by ranges and buoys. The Swash Channel leads from the eastward close inshore and has a depth of about 7 feet; this channel is not marked and is used only by small local craft. On the western side of the entrance, between Dauphin Island and West Sand Island, are two channels which are sometimes used by small local vessels, but they are constantly shifting and are therefore unreliable. Pelican Channel is the one nearest Dauphin Island; through it a maximum draft of about 5 feet can be taken into Mobile Bay. Middle Channel leads to the northward of West Sand Island; it has a changing depth of over 7 feet, but the shoals lying on the western side of the Main Ship Channel will not permit a greater draft than 7 feet to enter the bay from this direction. Neither the Pelican nor the Middle Channel is marked, and local knowledge is necessary for their use. Only two of the passes from Mississippi Sound into Mobile Bay are used. Grants Pass, which leads close to the southward of Grants Island, has a depth of about 6 feet; the pass is lighted in fine weather by private parties, but should not be attempted at night by a stranger. Pass aux Herons is just to the southward

*These distances are estimated, in statute miles.

of Grants Pass; it has 4 feet at low water and $5\frac{1}{2}$ feet at high water, but it is not marked and requires local knowledge for its passage. The dredged channel from the Lower Fleet to the city of Mobile has a depth of 23 feet, a width of 200 to 280 feet, and is nearly 24 miles long; it is well marked by cluster pile beacons, light-houses, and lighted beacons (see table, page 14); the bends are marked by additional beacons. Improvements are in progress to deepen and widen this channel. After freshets in the rivers many floating logs will be met with in the channel just below Mobile.

Anchorage.—The usual anchorage is the Lower Fleet, off the southern end of the dredged channel; the depth at this anchorage ranges from 19 to 24 feet and the bottom is soft mud. The best water, with good holding ground, is found to the northward and northwestward of Fort Morgan, and to the southward of the Middle Ground, the depth here ranging from 5 to 7 fathoms; this is where the deeper draft vessels anchor. Both the anchorage in the Lower Fleet and that to the southward of the Middle Ground are secure, but in a norther a short, heavy, choppy sea is raised, which makes small vessels uncomfortable. The harbor master has control of the mooring of all vessels in the river and the draft to which vessels shall load (see the harbor regulations, Appendix I). The quarantine anchorage is to the northward of the quarantine station on Mobile Point and is marked by yellow buoys.

Quarantine. The quarantine station is on the south shore of Mobile Bay, to the eastward of Fort Morgan; it is marked by a yellow flag during daylight and by a red light at night. Vessels subject to visitation by the quarantine physician are boarded by him near the quarantine station. (See quarantine regulations, Appendix I, and National Quarantines, Appendix IV.)

Pilots.—Pilotage is compulsory, vessels spoken and not taking pilot being obliged to pay half pilotage. (See pilot laws, regulations, and rates, Appendix I.) Pilots will be found cruising outside the bar. A vessel desiring a pilot and not having been boarded by one can heave-to, or anchor in 7 to 10 fathoms of water, outside the bar with signal set until boarded.

Towboats are used by all the larger sailing vessels; they will usually be found cruising outside the bar in fine weather, or, will be near Sand Island Lighthouse on the lookout for approaching vessels. Towboats can always be had at Mobile.

Lines inside of which the "Rules of the Road" for harbors, rivers, and inland waters, etc., are to be followed:—"From Mobile Bay Outer or Deep Sea whistling buoy (or its watch buoy in summer) NE. by N. to the shore of Mobile Point, and from the whistling buoy NW. by W. to the shore of Dauphin Island."

Supplies.—Bituminous coal for steamers can be had in unlimited quantities at Mobile, either through chutes or from cars alongside the wharves, or from lighters in the stream. The supply of anthracite coal is usually limited to 1,000 tons. Water can be had through pipe and hose alongside the wharves, or from water boats in the stream. Provisions and ship chandler's stores can be obtained in the city.

Repairs.—The facilities for repairs to hulls of vessels and machinery of steamers are good at Mobile. There is one sectional dock 214 feet on keel blocks, 50 feet beam, and 12 feet draft, on which a vessel of 1,000 tons can be lifted; also one marine railway capable of hauling out a vessel 200 feet long on keel and 1,000 tons burden. There are good shears for lifting weights up to 50 tons.

Wind Signals of the United States Weather Bureau are displayed at Mobile on the post office building, corner of St. Francis and Government streets, but these signals can not be seen by the shipping in the harbor. There is a special display station at Fort Morgan, the signals from which can be seen all over the lower part of the bay. For an explanation of these signals, see Appendix II.

The United States Marine Hospital Service has a hospital at Mobile for the treatment of seamen (see Appendix IV).

Winds.—The prevailing winds are southerly and southeasterly in spring, southerly in summer, northerly in fall, and northerly and easterly in winter. The strongest winds are southerly in summer and northerly in winter. Severe northers occur during the winter; they lower the water in the bay so as to interfere with the deeper draft vessels bound through the dredged channel. During southerly gales the bar can not be crossed by vessels of over 18 feet draft. (See, also, remarks, page 24.)

Fogs.—There is considerable fog during the early spring months with southerly breezes; northerly breezes clear it away.

Tides.—See table, page 21, and remarks on page 23.

Currents.—The currents vary with the force and direction of the wind. The main body of the flood enters the bay through the Main Ship Channel and has a velocity of about 2 knots; it has a tendency to set toward Sand Island. The ebb has about the same velocity but follows the general direction of the Main Ship Channel. During the ebb current, with a strong southerly breeze, the sea on the bar is dangerous for small craft. In the dredged channel the velocity of the currents is about 1 knot, the flood setting up the bay and the ebb down the bay, but the force and direction of the wind have a very marked effect on the set and drift.

SAILING DIRECTIONS, MOBILE BAY.

The following directions are good, in clear weather and with a smooth sea, for vessels of 18 feet draft, either in the daytime or at night, as far as the anchorage south of Middle Ground; they are also good, in the daytime, up to the city of Mobile. Vessels of deeper draft should employ a pilot and all sailing vessels should employ a towboat from the Lower Bay to the city.

1. Approaching from the Eastward.—From the buoy off Cape San Blas, a **W. $\frac{1}{4}$ N.** course made good for 145 miles will lead to the whistling buoy off Mobile Bay entrance.

Or, from a position 1 mile **S.** of the whistling buoy off Pensacola entrance, a **WSW. $\frac{1}{2}$ W.** course made good for 39 $\frac{1}{2}$ miles will lead to the whistling buoy off Mobile Bay entrance; in a heavy sea deep draft vessels should keep 1 mile farther offshore to obtain a depth of over 6 fathoms.

Remarks.—The coast between Cape San Blas and Mobile Bay entrance can be approached with safety by vessels of the deepest draft as close as 5 miles. There are no marked natural features, the lighthouses being the principal aids for the navigator to depend on. Sand Island and Mobile Point lighthouses will be readily distinguished before the whistling buoy at the entrance is sighted.

1 A. Approaching from the Southward or Westward.—Vessels approaching from the southward should stand **N.** on the meridian of 80° 00' W. until Sand Island Lighthouse and the whistling buoy at the entrance are made.

Or, from a position 3 miles **SE.** from the light-vessel off the South Pass of the Mississippi River, make good a **NNE. $\frac{1}{2}$ E.** course for 90 $\frac{1}{2}$ miles; this should lead to the whistling buoy off the entrance.

Or, with Ship Island Lighthouse bearing **NW.**, distant 5 miles, make good a **E. $\frac{1}{2}$ N.** course for 45 miles, which should lead to the whistling buoy off the entrance.

Remarks.—Vessels approaching Mobile Bay from the southward, and not sure of their reckoning, can tell whether they have fallen to the eastward or to the westward of the entrance by the general appearance of the land. For a distance of 40 miles to the eastward the shore, although low, is wooded and unbroken. To the westward of the entrance, for a distance of 50 miles, extends a chain of islands which, while wooded in places, are generally low and bare. The water shoals gradually while approaching the shore from the southward and the lead can be depended on to give warning of too close an approach. A vessel uncertain of her position may stand in until the water shoals to 7 fathoms, and having made the land stand along shore in this depth until Sand Island Lighthouse is sighted.

2. Entering and to the Anchorage.—From the whistling buoy off the entrance, steer for Sand Island Lighthouse, keeping the day beacon on Sand Island (pyramidal structure, half black and half white perpendicularly) well open to the left of the lighthouse; leave black can buoy No. 1 on the port hand and the red bell buoy about 200 yards on the starboard hand. When the red beacon on Mobile Point is in range with the lighthouse on the lunette of Fort Morgan, steer **N. $\frac{1}{2}$ E.** up the channel. Anchor when Fort Morgan bears about **SE.**, distant $\frac{1}{2}$ mile. If bound to the city of Mobile, follow the directions in section 3.

At night.—While still to the southward of the whistling buoy, bring the low, white range light on Sand Island just open to the left of Sand Island Light; then steer for Sand Island Light, keeping the range light a little to the left of it. Keep a sharp lookout for the Mobile Point Range, and when the fixed white (front) light is in range with the fixed red (rear) light haul up so as to bring the range a very little on the starboard bow; the course should be between **N. $\frac{1}{2}$ E.** and **N. $\frac{3}{4}$ E.** When the light (fixed red) on Fort Morgan bears about **SE.**, anchor in about 8 fathoms of water, soft bottom.

Remarks.—The range light on Sand Island is on the gable of the light keeper's dwelling, and this, open a little to the left of the lighthouse, will lead in the deepest water over the bar. The Mobile Point Range comes on very slowly, and care should be taken to get the beacon and lighthouse exactly in line. When standing up the channel on the **N. $\frac{1}{2}$ E.** course the Mobile Point Range will gradually open out, the lighthouse showing to the left of the beacon; breakers will usually be seen on the shoal on the east side of the channel; the black

MOBILE BAY—SAILING DIRECTIONS.

buoy and boiler on the west side of the channel should be given a good berth, and care should be taken not to be set over on the shoals by the currents which, at times, have considerable velocity. When Fort Morgan is a little abaft the beam the quarantine station and long quarantine dock and breakwater will be seen on the north shore of Mobile Point, about $\frac{1}{2}$ mile to the eastward of Fort Morgan. The two gas buoys and the lighted beacon at the entrance to the dredged channel will be seen to the northward.

Dangers.—Shoals, which show nearly bare, extend $3\frac{1}{2}$ miles to the southward from Mobile Point on the east side of the channel into the bay. These shoals are nearly always marked by breakers, and at their southwestern point is a red bell buoy.

Shoals extend to the southward from Sand Island and are marked at their southern end by a black can buoy, No. 1; this is known as Southwest Spit buoy. The shoals which extend to the northward and westward from Sand Island are known under the general name of "West Bank"; the eastern edge of this bank is marked by two black can buoys and the remains of a boiler which very much resembles a black can buoy.

The shoals on both sides of the channel generally rise very abruptly from deep water and the lead is of but little use to give warning of danger while in the Main Ship Channel.

3. From the Lower Bay to the City of Mobile.—When about $\frac{3}{4}$ mile distant from Fort Morgan, bring the fort to bear **SE.** by **S.** and steer **NW.** by **N.**; when the lower gas buoy bears about **E.**, distant 300 yards, steer **N. $\frac{1}{4}$ E.**, leaving the upper gas buoy on the starboard hand and heading so as to leave the large red beacon, at the entrance to the dredged channel, about 50 yards on the starboard hand. From the Lower Channel beacon, steer about **N. $\frac{1}{4}$ E.**, passing to the westward of, and 50 yards from, the clusters of piles which mark the eastern edge of the channel. When up to Mobile Bay Lighthouse, leave it the same distance on the starboard hand, and leave the cluster of piles which is to the westward of the lighthouse on the port hand. From the lighthouse steer about **N.** by **W.**, following the row of pile clusters, leaving them 50 yards on the starboard hand, for a distance of 11 miles. Upper Channel beacon (painted red) is left on the starboard hand and a cluster of piles, to the westward of it, on the port hand; the course should then be changed to **N.** by **E.** Two red beacons should be nearly in range ahead, the farther one being open a little to the left of the near one; another red beacon should be seen still farther to the left of the two nearly in range. Leave the clusters of piles 50 yards on the starboard hand and pass 50 yards to the westward of the front red beacon; a cluster of piles to the westward of this beacon should be left on the port hand. From the front red beacon steer about **N. $\frac{1}{4}$ W.**, keeping Battery Gladden Lighthouse open a little to the left of the red beacon which showed to the left of the range while standing on the **N.** by **E.** course. Leave the red beacon which is nearly in range with Battery Gladden Lighthouse about 60 yards on the starboard hand (a cluster of piles to the westward having been left an equal distance on the port hand) and turn, with a starboard helm, so as to bring this red beacon and the one to the southeastward in range over the stern; stand on this range a little over $\frac{1}{4}$ mile and then haul a little to the northward, fair into the entrance of Mobile River, leaving two clusters of piles on the starboard hand. Stand up the river in mid-stream and anchor according to the harbor regulations, Appendix I.

Remarks.—There are no extraordinary precautions to be taken except, when in a steamer, to slow down in the dredged channel when vessels are passing each other. The pile clusters are close enough to be seen some distance and no difficulty should be experienced in following them. At each bend in the dredged channel a cluster of piles is placed on the western edge of the channel, but these turning clusters can be readily distinguished as they are not in line with those that mark the eastern edge of the channel.

On the **N. $\frac{1}{4}$ W.** course, with Battery Gladden Lighthouse (see table, page 14) ahead, the red beacon which is seen to the eastward should be given a wide berth; this beacon does not mark the edge of the channel but is the rear range beacon for two ranges. On the **N. $\frac{1}{4}$ W.** course, and when standing into the river, many snags will be seen on both sides of the channel and at certain seasons the channel will be full of floating logs, trees, and brush, which are brought down the river by the ebb current.

MISSISSIPPI SOUND*

is the name given to the shallow water extending along the coast, for a distance of about 70 miles, to the westward of Mobile Bay and separated from the Gulf of Mexico by a chain of long, narrow islands and shoals. The sound, which is from 5 to 10 miles wide, affords what might be termed an inland passage along the coast

* Shown on charts 189, 190, scale $\frac{1}{80,000}$, price of each \$0.50.

from Mobile Bay to Lake Borgne. The shoalest part of this passage is at its eastern end where the sound joins Mobile Bay; here it is good for a draft of only 5½ feet at ordinary high water; the remainder of the passage is good for a depth of 10 feet, except its western part (to the westward of Cat Island), which has a least depth of about 7½ feet.

Just inside the islands which separate the sound from the Gulf of Mexico are two good harbors; the easternmost, **Pascagoula Harbor**, can be entered by vessels of 20 feet draft through a well-buoyed channel, known as **Horn Island Pass**, which leads between **Petit Bois** and **Horn** islands. The other harbor is known as **Ship Island Harbor** and can be entered by vessels of 22½ feet draft through a buoyed channel leading just to the westward of **Ship Island**. These harbors are used for refuge by vessels standing along the coast outside, and with good ground tackle a vessel can ride out any gale. On **Ship Island** is the **National Quarantine Station** for this part of the Gulf of Mexico. **Cat Island Channel** is an entrance to the western part of Mississippi Sound from the Gulf of Mexico and **Chandeleur Sound**. A draft of about 14 feet can be taken into an anchorage in the channel, but only 7½ feet can be taken into the part of Mississippi Sound for which the channel is the entrance. **Pascagoula** and **Ship Island** harbors and **Cat Island Channel** are described separately and more fully in another part of this volume.

Besides the three entrances to the sound mentioned above there are several others of lesser importance. There is a narrow channel over the shoals which lie between **Dauphin** and **Petit Bois** islands, but it is not marked and is only used by local fishermen. Between **Horn Island** and **Ship Island** there is a channel with a depth of 12 feet which is sometimes used by fishermen and towboats, but as it is not marked it should never be attempted by a stranger. The channels into the sound from Mobile Bay are described under that heading.

Pass Marianne is the name given to the channel leading through the shoals which extend across the sound near its western end and just to the westward of **Cat Island**; it is marked by several buoys and **Merrill Shell Bank Lighthouse** (see table, page 14).

Biloxi Bay is a shallow body of water making into the north shore of the sound nearly 15 miles to the westward of **Pascagoula** and just to the eastward and northward of **Biloxi**. The bay has some trade in lumber, wood, charcoal, and oysters, carried in vessels of about 5 feet draft. **Ocean Springs** is a village on the north shore, and just above it the bay is crossed by a railroad bridge. A long, shallow extension of the bay to the westward is known as the **Back Bay of Biloxi**.

St. Louis Bay is a large, irregularly shaped, shallow body of water making to the northward near the western end of the sound; the entrance of the bay is crossed by a railroad bridge. The bay is of no commercial importance and is frequented only by small local craft.

With the exception of the vessels that enter **Pascagoula** and **Ship Island** harbors, the vessels trading in the sound are generally small sloops and schooners of from 4 to 7 feet draft and towboats and barges which take lumber and timber to the vessels loading at the anchorages. A stern-wheel steamboat runs between **New Orleans** and **Moss Point**, on the **Pascagoula River**, and makes landings along the route.

On the north shore of Mississippi Sound are **Pascagoula** and **Biloxi**, two ports which ship considerable lumber and some naval stores, and the towns of **Mississippi City**, **Pass Christian**, and **Bay St. Louis**, these last being summer and winter resorts. **Pascagoula** and **Biloxi** are described under separate headings in this volume.

Mississippi City is 7 miles to the westward of **Biloxi**; a depth of 7 feet can be taken to within 1 mile of the town, while the depth at the wharves is about 4 feet. Between **Biloxi** and **Mississippi City** is a summer resort called **Beauvoir**.

Pass Christian is near the western end of the sound, about 20 miles to the westward of **Biloxi**; between **Pass Christian** and **Mississippi City** are two summer resorts, **Gulfport** and **Long Beach**. **Pass Christian** has a little trade in fish, oysters, coal, and building material; 6 feet is the deepest draft of the vessels trading here, and the depth alongside the wharves is 4½ feet.

Bay St. Louis, a popular summer and winter resort, is about 2 miles to the westward of **Pass Christian** and separated from the latter by **St. Louis Bay**. The town has a little trade in coal, building material, and fish; the deepest draft of vessels trading there is 7½ feet. About 3 and 6 miles, respectively, to the westward of **Bay St. Louis** are the villages of **Waveland** and **Gulf View**.

Anchorages.—There is good anchorage anywhere in the sound where the bottom is soft. The principal anchorages used by the larger vessels are **Pascagoula Harbor** (which includes **Horn Island Anchorage**) and **Ship Island Harbor**.

Pilots.—There are licensed pilots for **Pascagoula** and **Ship Island** harbors and the passes leading to them, but pilots for the sound and lakes **Borgne** and **Pontchartrain** are mostly fishermen and can be found almost anywhere in the sound.

**SAILING DIRECTIONS, MISSISSIPPI SOUND, FROM MOBILE BAY TO GRAND ISLAND PASS,
LAKE BORGNE.**

The least depth, which is 6 feet, is found in Grants Pass; in the channel through the sound the depths range from 7 to 19 feet. The current sets strongly through Grants Pass and vessels must have a fair wind to pass through.

1. *Passing through Mississippi Sound from Mobile Bay.*—From the lower gas buoy in Mobile Bay, steer **NW.** by **W.** $\frac{1}{4}$ **W.** for $5\frac{1}{4}$ miles. Or, from the Lower Channel beacon (No. 51), steer **W.** for $4\frac{3}{4}$ miles. The northern end of Grants Island (small, low island, with a tumble-down shed near its southern side) should then bear about **W.** by **S.** and be distant about $\frac{1}{2}$ mile. From this position steer toward the island and for a cluster of small brush stakes which marks the edge of the channel; leave these stakes about 20 yards on the starboard hand and steer so as to leave the southern end of the island about 50 yards on the starboard hand. Round the southern end of the island at this distance and steer about **W.**, leaving several brush stakes which mark the edge of the channel, and a cluster of brush stakes which marks the western entrance, on the starboard hand. From the last-mentioned cluster of brush stakes, steer **WSW.** $\frac{1}{4}$ **W.** for $20\frac{1}{4}$ miles and until Horn Island Lighthouse bears abeam, distant about $1\frac{3}{4}$ miles; after having run $15\frac{1}{2}$ miles on this course, a red nun buoy should be left about $\frac{1}{4}$ mile on the starboard hand.

With Horn Island Lighthouse bearing nearly S. by E., distant about $1\frac{3}{4}$ miles, steer **W.** for 4 miles and leave a red nun buoy $\frac{1}{4}$ mile on the starboard hand; when this buoy is abeam, steer **NW.** by **W.** $\frac{1}{2}$ **W.** for 2 miles. Round Island Lighthouse (see table, page 14) should then bear **NE.** by **E.** $\frac{3}{4}$ **E.**, distant 3 miles. From this position make good a **W.** $\frac{3}{8}$ **S.** course for $28\frac{1}{4}$ miles; on this course the northwestern end of Horn Island and northeastern ends of Ship and Cat islands should be given a berth of $1\frac{1}{4}$ miles. Having made good the **W.** $\frac{3}{8}$ **S.** course for $28\frac{1}{4}$ miles, Merrill Shell Bank Lighthouse should bear **SW.** by **W.** $\frac{1}{4}$ **W.**, distant 4 miles, and a black can buoy, marking Cat Island Shoal, should be $\frac{1}{2}$ mile on the port quarter. Then steer about **SW.** $\frac{3}{4}$ **W.** so as to pass $\frac{1}{2}$ mile to the southward of the lighthouse, and when it bears **N.** steer **W.** $\frac{1}{2}$ **S.** for a little over $1\frac{1}{2}$ miles, leaving a black can buoy (No. 9) on the port hand. From this position steer **SW.** by **W.** $\frac{1}{4}$ **W.**, keeping Lake Borgne Lighthouse well on the starboard bow, and passing $\frac{1}{2}$ mile to the southward of the ruins of the old lighthouse which formerly stood on St. Joseph Island (the island is now washed away and the ruins stand in about 1 foot of water). Pass $\frac{3}{8}$ to $\frac{1}{2}$ mile to the southward of Lake Borgne Lighthouse on a **W.** by **S.** course, which will lead through Grand Island Pass.

If desiring to pass through Lake Borgne, follow the directions under that heading in another part of this volume.

If bound to Pascagoula or Scranton.—When standing on the **WSW.** $\frac{1}{4}$ **W.** course from Grants Pass and when the red buoy, which is $15\frac{1}{2}$ miles from the pass, bears **N.**, about $\frac{1}{2}$ mile distant, steer **NW.** by **W.** $\frac{1}{4}$ **W.** for Pascagoula. Or, *if bound to Scranton,* steer **NW.** by **W.** $\frac{3}{4}$ **W.** from the red buoy and, when on the range of the two beacons, follow the sailing directions for entering East Pascagoula River in another part of this volume.

If bound to Horn Island Anchorage.—When standing through the sound, when Horn Island Lighthouse bears to the southward of **SW.** $\frac{1}{4}$ **W.**, steer for it and anchor about $\frac{3}{4}$ mile to the northward of the lighthouse.

If bound to Biloxi.—When to the westward of Round Island, and having stood 9 miles on the **W.** $\frac{3}{8}$ **S.** course, steer **NW.** until Biloxi Lighthouse (see table, page 14) bears **N.** $\frac{1}{4}$ **W.**; then steer for the lighthouse on this bearing and follow the red buoys which mark the edge of the dredged channel and which should be left about 20 yards on the starboard hand.

Note.—When in the sound, Biloxi Lighthouse can be steered for on any bearing between **NE.** and **NW.**, but the shore should not be approached closer than $1\frac{1}{4}$ miles unless the lighthouse is brought to bear **N.** $\frac{1}{4}$ **W.**

If bound to Ship Island Anchorage.—When standing through the sound, when Ship Island Lighthouse bears between **SE.** and **SW.**, steer for the lighthouse and anchor off the north side of Ship Island, taking care not to go too close to the shore.

If bound to Bay St. Louis.—Having passed Merrill Shell Bank Lighthouse, and when the lighthouse is 1 mile distant on the starboard quarter, steer **NW.** by **W.** and, leaving a red buoy on the starboard hand, anchor anywhere $\frac{1}{2}$ mile offshore.

PASCAGOULA HARBOR AND PORT OF PASCAGOULA.*

The name of **Pascagoula Harbor**, or **Pascagoula Bay**, is applied to that part of Mississippi Sound lying to the southward and southeastward of Pascagoula River and extending from the north shore to Horn and Petit Bois islands.

Pascagoula is one of the important lumber-shipping ports on the Gulf Coast; many vessels, mostly foreign, clear from this port, and most of the lumber that is loaded at Ship Island Harbor is towed there from the Pascagoula River. The deepest draft taken out of the port is $20\frac{1}{2}$ feet in summer and about $19\frac{1}{2}$ in winter.

The principal entrance from the Gulf of Mexico is **Horn Island Pass**, which lies 24 miles to the westward of Sand Island Lighthouse, at the entrance to Mobile Bay, and $23\frac{1}{2}$ miles to the eastward of Ship Island Lighthouse. Between the western point of **Petit Bois Island** and the eastern point of **Horn Island** the pass has a width of $1\frac{1}{2}$ miles, but shoals make out from both sides forming a shifting bar through which there is a narrow, buoyed channel with a depth of 19 feet. A vessel entering Mississippi Sound over Ship Island bar can carry a depth of about 14 feet through the sound to Pascagoula Harbor, but the channel is very narrow in places and, although it is buoyed, some local knowledge is necessary to carry the best water.

Pascagoula River is formed by the junction of the **Chickasahay** and **Leaf** rivers and empties into Mississippi Sound from the northward about 23 miles to the westward of Mobile Bay; it has two mouths, about 2 miles apart, known respectively as the **East** and **West Pascagoula** rivers, but the **East Pascagoula River** is the commercial entrance and the only one of importance, and is locally spoken of as the Pascagoula River. Above Moss Point the river is important only as a water way for logs and timber which is rafted to the sawmills near its mouth; it has a depth of 6 feet for a distance of 44 miles in a narrow, crooked channel. The entrance to the **East Pascagoula River** is obstructed by shoals through which a channel with a depth of $9\frac{1}{2}$ feet has been dredged, and a draft of 9 to 10 feet can be taken in and out of the river and as far as Moss Point. Improvements are contemplated to obtain a channel 12 feet deep and of navigable width from the deep water in Mississippi Sound to Moss Point. The dredged channel is marked by a range of two lighted beacons and on the western point, at the entrance of the river, is **East Pascagoula River Lighthouse** (see table, page 14).

The town of **Pascagoula** is on the eastern shore of the mouth of the **East Pascagoula River** and extends some distance along the shore of Mississippi Sound; the town itself is of no commercial importance, but it is a delightful summer resort, and the deputy collector of customs, harbor master, and pilots have offices and reside in the town. A number of wharves extend a long distance into the sound, but only one of these wharves has a depth of 7 feet at its end, the depths at the others ranging from 3 to 5 feet.

The town of **Scranton** is on the east bank of the **East Pascagoula River** about $1\frac{1}{2}$ miles above its mouth. The town has some trade with Mobile, New Orleans, and towns along the sound, and has railroad communication with the two former cities and with Moss Point. There is one large sawmill which ships lumber in small vessels and lighters to the large vessels at the anchorages. A draft of 10 feet can be taken to Scranton and alongside some of the wharves. The railroad bridge which crosses the river at Scranton has a draw about 75 feet wide.

Moss Point is a small town on the east bank of the **Pascagoula River** about 7 miles above the mouth of the **East Pascagoula**; it is the most important point on Mississippi Sound for the shipment of lumber, which is here loaded at the sawmills into lighters and towed to the vessels anchored in Pascagoula and Ship Island harbors. A draft of 10 feet can be taken to the sawmills, and vessels of this draft sometimes load at Moss Point. A branch railroad connects the town with Scranton, from which it receives most of its supplies.

Prominent features.—There are no prominent natural landmarks at the entrance to **Horn Island Pass**. **Horn Island Lighthouse** (see table, page 14) is near the eastern end of the island and is the most easily recognized aid for a stranger; the long, shifting sand spit at the eastern end of the island is marked by two piles, which are all that remain of the old lighthouse formerly standing there. Near the middle of Mississippi Sound, and to the westward of **Horn Island Pass**, is **Round Island**, a low island covered with tall trees; near the southern end of the island is **Round Island Lighthouse** (see table, page 14).

* Shown on chart 139, scale $\frac{1}{80,000}$, price \$0.50.

PASCAGOULA HARBOR—INFORMATION.

Anchorage.—There are two principal anchorages where the larger vessels load. Vessels of less than 16 feet draft generally load at the "**Middle Fleet**", which is 3 miles to the eastward of Round Island. The deeper draft vessels anchor at what is known as the "**Horn Island Fleet**", just inside the eastern point of Horn Island and to the northward of the lighthouse. There is good anchorage off the town of Pascagoula and in the river. The harbor master has control of the berthing and shifting of vessels at the anchorages.

Quarantine.—The **National Quarantine Station** is at Ship Island, and vessels with infectious or contagious diseases on board, or from a port having such diseases, are ordered there by the pilots. The **State Quarantine Station** is on Round Island; vessels subject to visitation by the health officer are brought to at the quarantine anchorage south of Round Island, where they are boarded and given pratique.* (See, also, quarantine rules and regulations, Appendix I, and National Quarantines, Appendix IV.)

Pilots.—Pilotage is compulsory for all vessels spoken outside the bar buoy, except United States vessels of 150 tons or less burden. Pilots are on duty at Horn Island Pass ready to take vessels in. A vessel desiring a pilot should set the signal and stand off and on outside the bar buoy, or anchor about 3 miles S. of Horn Island Lighthouse. (See pilot laws, regulations, and rates in Appendix I.)

Towboats are generally on the lookout for vessels approaching Horn Island Pass. About one-half of the vessels entering the port employ towboats; loaded vessels generally tow out.

Supplies.—A limited quantity of bituminous coal can be delivered to steamers in lighters. Water can be obtained from water boats in the harbor. Provisions and ship chandler's stores can be obtained at Pascagoula and Scranton.

Repairs.—Vessels of 300 to 400 tons and a draft of 9 feet can be hauled out and repaired at Scranton; larger vessels and steamers go to Mobile for repairs.

Wind Signals of the United States Weather Bureau are displayed at special display stations at Pascagoula, Scranton, and Moss Point.

Winds.—Northers occur during the winter months; they do not affect vessels at either of the anchorages if provided with good ground tackle. They may, however, prevent vessels from loading during a short period. (See remarks on page 24.)

Tides.—See table, page 21, and remarks on page 23.

Currents.—In Horn Island Pass the ebb current generally sets to the southeastward and the flood to the northward and westward across the shoals. Winds, however, greatly affect the velocity and direction of the currents, as they do the rise and fall of the tides.

SAILING DIRECTIONS, HORN ISLAND PASS AND PASCAGOULA HARBOR.

The directions in section 1 and 1 A are good for any draft. No stranger of over 10 feet draft should attempt to enter through Horn Island Pass without employing a pilot; the bar shifts continually and even the pilots will not bring vessels in at night; the directions in section 2 are therefore only very general. The directions in section 3 are good for a draft of 8 feet to the town of Scranton.

1. Approaching from the Eastward or Southeastward.—Vessels standing along the coast from the whistling buoy off Mobile Bar should steer **W. $\frac{1}{2}$ S.** for 25 miles; Horn Island Lighthouse should then bear **NW. $\frac{1}{2}$ N.** and the whistling buoy at the entrance to Horn Island Pass should be in line with the lighthouse.

Vessels from the southeastward should make Sand Island Lighthouse, at the entrance to Mobile Bay, and when it bears **N.**, distant about 8 miles, steer **W. by N.**; having made good this course for a distance of 23 miles, Horn Island Lighthouse should bear **NW. $\frac{1}{2}$ N.** and be distant $3\frac{1}{2}$ miles. Then stand for the whistling buoy until it is $\frac{1}{2}$ mile distant and, if of over 10 feet draft, anchor, or stand off and on, with signal set until boarded by a pilot. If of less than 10 feet draft, follow the directions in section 2.

Remarks.—Sand Island Lighthouse is the best aid and landfall that can be made, as it is visible farther at sea than any other aid to the eastward of the Mississippi River. On a clear day this lighthouse can be seen over 10 miles, and on a clear night about 17 miles. In thick weather a vessel should keep in over 7 fathoms of water, hauling offshore before the water shoals to that depth. This rule should be followed at night when the vessel is to the westward of Sand Island Lighthouse, and also when Horn Island Light is sighted. There are no special dangers to be guarded against; a vessel should not approach the shores of the islands too closely, and should keep outside the whistling buoy off Horn Island Pass.

* Vessels are advised to obtain pratique at the National Quarantine Station.

1 A. *Approaching from the Westward or Southwestward.*—Coming from Ship Island Harbor or Cat Island Channel, vessels should bring Ship Island Lighthouse to bear **N.** by **W.**, distant $3\frac{1}{2}$ miles, and steer **E.** by **N.** for $22\frac{1}{2}$ miles; Horn Island Lighthouse should then bear **N.** by **W.** and be about 2 miles distant. Or, if of less than 16 feet draft, bring Ship Island Lighthouse to bear **N.** by **W.**, distant $2\frac{1}{2}$ miles, and steer **E.** $\frac{1}{2}$ **N.** for $22\frac{1}{2}$ miles, when Horn Island Lighthouse should bear **N.** by **W.** and be nearly $1\frac{1}{2}$ miles distant.

If coming from the southwestward, vessels should sight the light-vessel off the South Pass of the Mississippi. With this light-vessel bearing **NW.**, distant 5 miles, a **N.** by **E.** $\frac{1}{4}$ **E.** course, made good for 80 miles, will lead to the whistling buoy off the entrance to Horn Island Pass; when Horn Island Lighthouse bears **N.** by **W.** and is distant $2\frac{1}{2}$ miles, anchor, or stand off and on, until boarded by a pilot.

Remarks.—When standing along shore on the **E.** $\frac{1}{4}$ **N.** course, the least water found will be about 22 feet: a red and black horizontally striped buoy, which marks a wreck about 3 miles **SE.** by **E.** from Ship Island Lighthouse, should be left $\frac{1}{2}$ mile on the port hand.

On the **E.** by **N.** course a red and black horizontally striped buoy, which marks a wreck about **SSE.** $\frac{1}{4}$ **E.**, distant $4\frac{1}{2}$ miles, from Ship Island Lighthouse, should be left about $\frac{1}{4}$ mile on the starboard hand.

On the **N.** by **E.** $\frac{1}{4}$ **E.** course from off South Pass, care should be taken not to approach Northeast Pass too closely. The Chandeleur Islands will be left at least 7 miles on the port hand, and Horn Island Lighthouse should be made ahead.

2. *Entering and to an Anchorage.*—As soon as the whistling buoy is sighted steer for it and leave it close-to on either hand; then steer for the outer of three black and white perpendicularly striped nun buoys, and when it is close aboard stand for the second buoy, and from this to the third. From the latter buoy steer about **N.** by **W.**, keeping the black can buoy, which will be seen $\frac{3}{4}$ mile to the eastward of the pile beacon, on the port bow. Leave this black can buoy about 100 yards on the port hand and haul to the westward, leaving black buoys Nos. 5 and 7 on the port hand. Anchor to the northward of buoy No. 7.

Remarks.—The channel shifts frequently and the buoys are moved to indicate the best water. A stranger must be guided entirely by the buoys. When crossing the bar care should be taken not to be set out of the channel by the currents, which at times have considerable velocity. The two piles (pile beacon), which mark the site of the old lighthouse, are well clear of the eastern point of Horn Island, which has washed away, but the shoal extends $\frac{1}{2}$ mile to the eastward of the piles. No intelligent description of the shoals can be given; during the summer, when the water is clear, they can be seen from aloft, or from the deck of a vessel.

3. *From Horn Island Pass to the Middle Fleet, or to Pascagoula or Scranton.*—Having followed the directions in section 2 until black can buoy No. 3 is about 100 yards distant on the port beam, steer **NNW.**

If bound to Middle Fleet, anchor in 17 feet of water when Round Island Lighthouse bears about **W.**

If bound to Pascagoula, continue the **NNW.** course and anchor off the wharves in 9 feet of water.

If bound to Scranton, continue the **NNW.** course, and when the two beacons in the entrance to East Pascagoula River are in range stand for them, course about **NW.**; continue on this range until up to the pile dolphins which mark the turn and eastern edge of the channel into the river; leave the dolphins about 15 yards on the starboard hand and follow a mid-channel course up the river. Anchor in mid-stream below the railroad bridge.

Remarks.—On the **NNW.** course the houses in Pascagoula will be ahead; several vessels will usually be found at anchor at the Middle Fleet. As Round Island Lighthouse draws on the beam the two range beacons and East Pascagoula River Lighthouse should be made well on the port bow. The dredged channel into the river is not very wide, and the range must be closely followed to carry a depth of over 8 feet. Some of the pile dolphins marking the turn and edge of the channel have suffered somewhat from collisions, but they are still good marks for entering.

SHIP ISLAND HARBOR*

is the name applied to an anchorage in Mississippi Sound lying just north of Ship Island. It is one of the best natural harbors on the Gulf Coast and lies about 47 miles to the westward of Sand Island Lighthouse and 11 miles to the northward of the northernmost of the Chandeleur Islands. The principal entrance from the gulf

*Shown on chart 190, scale $\frac{1}{80,000}$, price \$0.50.

is just to the westward of Ship Island, over what is known as **Ship Island Bar**. This bar shifts somewhat in heavy gales, but has a buoyed channel with a depth of about 21 feet; the deepest draft taken in over the bar is 22½ feet, but this requires a high tide and smooth water. A draft of 17 feet can be taken over the bar in a heavy sea, but requires local knowledge. Near the western end of Ship Island is **Ship Island Lighthouse** (see table, page 14), the principal guide to the entrance from the gulf.

The entrance over Ship Island Bar is also one of the principal approaches from the Gulf to the western part of Mississippi Sound and the towns along its northern shore from Biloxi to Pass Christian.

Biloxi, on the north shore of the sound and a little over 11 miles N. by E. from Ship Island Lighthouse, is the nearest post office and railroad station to the vessels at anchor in Ship Island Harbor. A dredged channel about 150 feet wide and 6 feet deep leads through the shoals which lie off the town; the depth in this channel is said to be decreasing. The deepest draft that can be taken to Biloxi, under favorable conditions, is 8 feet; there is a depth of 7 feet at some of the wharves. Only small vessels go to Biloxi, the trade being confined to local vessels of about 5½ feet draft.

Prominent features.—Ship Island Lighthouse is easily recognized by a stranger. At the end of the western point of Ship Island is a round brick fort with sodded parapet which forms a conspicuous mark for vessels entering the harbor; the shipping at anchor can also be seen a long distance to seaward. Vessels coming from the southward may sight **Chandeleur Lighthouse** (see table, page 14), which is 10¼ miles SSE. ¼ E. from Ship Island Lighthouse. About 5 miles to the westward of Ship Island, near the northeastern end of Cat Island, is a high sand hill which may be seen on a clear day when approaching Ship Island Bar.

Anchorage.—The anchorage for the deeper draft vessels is to the northward of Ship Island in from 19 to 25 feet of water. Good anchorage and holding ground may be had almost anywhere in Mississippi Sound between Ship Island and the north shore, wherever the depth is suitable. The harbor master has control of the anchorage and berthing of all vessels entering the harbor (see the rules and regulations for Ship Island Harbor, Appendix I). The quarantine anchorage is to the northward of Ship Island and about 2 miles to the eastward of the regular anchorage.

Quarantine.—The National Quarantine Station is on Ship Island about ¾ miles to the eastward of the lighthouse (see National Quarantines, Appendix IV).

Pilots.—Pilots will be found cruising outside of, or anchored off, the bar (see pilot laws, regulations, and rates, Appendix I). Persons competent to pilot vessels in Mississippi Sound, Lake Borgne, and Lake Pontchartrain, can be found at Ship Island or Biloxi.

Towboats.—Vessels entering seldom use a towboat; laden vessels sometimes tow out over the bar; the towboats bringing lumber to the vessel generally tow her to sea.

Supplies.—Provisions and ship chandler's stores can be obtained at Biloxi or from Scranton. Fresh water can be had from water boats.

Repairs.—The nearest place where repairs to large vessels and machinery of steamers can be made is Mobile (see, also, Pascagoula Harbor and port of Pascagoula).

Tides.—See table, page 21, and remarks, page 23.

SAILING DIRECTIONS, SHIP ISLAND HARBOR AND BILOXI.

The directions in sections 1 and 1A are good, as far as the entrance, for any draft that can enter the harbor. Strangers of over 15 feet draft should employ a pilot to enter. In the daytime, with clear weather, these directions are good for a draft of 15 feet, but at night no stranger of over 12 feet draft should attempt to enter.

1. Approaching and Entering from the Eastward.—From a position ½ mile to the southward of the whistling buoy off Mobile Bay entrance, a **W. ¼ S.** course made good for 45 miles should lead to a position from which Ship Island Lighthouse bears **NW.**, distant 5 miles.

Or, having Sand Island Lighthouse bearing **N.**, distant 8 miles, a **W. ¼ N.** course made good for 44½ miles should lead to a position from which Ship Island Lighthouse bears **NW.**, distant 5 miles. From this position steer **W.** by **N.** until Ship Island Lighthouse bears on the starboard beam, distant a little over 2½ miles, then:

If over 15 feet draft, take a pilot.

*If of less than 15 feet draft, steer **N. ¼ W.**; leave the bell buoy well on the starboard hand and pass about 300 yards to the eastward of black buoys Nos. 1 and 3. When the lighthouse bears abeam, steer **NE. ¼ E.**, leaving red buoy No. 4 about 500 yards on the*

starboard hand and passing to the northward of a red and black horizontally striped buoy which marks a wreck. When to the northeastward of this buoy, anchor in $3\frac{1}{4}$ to $4\frac{1}{2}$ fathoms of water, soft bottom.

Remarks.—On the **W. $\frac{1}{2}$ S.** course the trees on the islands to the northward and Horn Island Lighthouse will be sighted; the latter should be $4\frac{1}{2}$ miles distant when abeam. Ship Island Lighthouse and the fort near the western end of Ship Island should be seen at a distance of 8 miles.

The **W. $\frac{1}{2}$ N.** course leads $6\frac{1}{4}$ miles to the southward of Horn Island Lighthouse. As Ship Island Lighthouse approaches a **NW.** bearing the water will be found to shoal gradually, and when the lighthouse is on that bearing the depth should be between 4 and 5 fathoms. A red and black horizontally striped buoy, which marks a wreck, lies $4\frac{1}{2}$ miles **SSE. $\frac{1}{2}$ E.** from Ship Island Lighthouse; this buoy should not be approached closer than $\frac{1}{2}$ mile, the sailing lines passing $\frac{3}{4}$ mile to the northward of it.

Vessels headed by the wind can anchor anywhere to the southwestward of the bell buoy in $4\frac{1}{2}$ to $4\frac{3}{4}$ fathoms of water and either wait for a shift of wind or take a towboat. Vessels of less than 12 feet draft can beat in if the sea is not heavy, taking care, however, to give the lighthouse a berth of at least $\frac{1}{2}$ mile and to stand not more than $1\frac{1}{2}$ miles to the westward and northwestward from the lighthouse. The shoal spots nearest the channel have 16 to 18 feet of water over them and are marked by buoys. The red buoys along the north shore of Ship Island mark the edge of the shoal which extends off from and along the shore of the island.

1 A. *Approaching and Entering from the Southward.*—A vessel having sighted the light-vessel off the South Pass of the Mississippi should bring the light-vessel to bear **NW.**, distant 5 miles, and then steer **N.** by **E. $\frac{1}{2}$ E.** for 50 miles. Then steer **N. $\frac{1}{2}$ W.** for 20 miles, and then **NW.** by **W. $\frac{3}{4}$ W.**, until Ship Island Lighthouse bears about **N.**, distant $3\frac{1}{4}$ miles.

Or, a vessel should stand to the northward in Longitude $88^{\circ} 30'$ W. until Latitude $30^{\circ} 00'$ N. is reached; then steer **W.**, using the lead, and when the water shoals to 7 fathoms the Chandeleur Islands should be sighted (Chandeleur Lighthouse should be sighted while the vessel is in 12 fathoms of water). Follow the shore of the islands, giving them a berth of about 4 miles, and bring the lighthouse to bear **S.**, distant $3\frac{1}{4}$ miles; then steer **NW.** by **W. $\frac{1}{2}$ W.** until Ship Island Lighthouse bears **N.**, distant $3\frac{1}{4}$ miles.

With Ship Island Lighthouse bearing N., distant about $3\frac{1}{4}$ miles, if of more than 15 feet draft, steer **NW.** for about $1\frac{1}{2}$ miles and anchor, or take a pilot. If of less than 15 feet draft, bring Ship Island Lighthouse to bear **N.** by **E.**, distant a little over $2\frac{1}{2}$ miles; then steer **N. $\frac{1}{2}$ W.** and follow the directions in the fourth paragraph of section 1, preceding, until up to the anchorage.

Remarks.—The **N. by E. $\frac{1}{2}$ E.** course should lead at least 2 miles to the eastward of the shoal water off the passes of the Mississippi. On the **N. $\frac{1}{2}$ W.** course the Chandeleur Islands are left nearly 5 miles on the port hand, and the course should not lead in less than 7 fathoms of water. On the **NW.** by **W. $\frac{3}{4}$ W.** course the water shoals gradually and, as Ship Island Lighthouse approaches a **NNW. $\frac{1}{2}$ W.** bearing, care must be taken to keep clear of the wreck, and the buoy which marks it, lying on this bearing $4\frac{1}{2}$ miles from the lighthouse.

When standing to the northward on the meridian of $88^{\circ} 30'$ W. the lead will be a good guide to show whether the vessel is to the westward of her reckoning. If soundings of less than 13 fathoms are obtained between latitudes $29^{\circ} 30'$ and $30^{\circ} 00'$ N., it is an indication that the vessel is to the westward of her reckoning. In no case should a deep draft stranger shoal the water to less than 7 fathoms before making sure of the vessel's position. The eastern shore of the Chandeleur Islands can be approached as close as 2 miles with over $4\frac{1}{2}$ fathoms of water. The northern point of the islands has been gradually washing away and should be given a berth of at least $1\frac{1}{2}$ miles.

CAT ISLAND CHANNEL *

is the name given to the eastern part of the channel which leads from the Gulf of Mexico into the western end of Mississippi Sound through the extensive banks and shoals which make off from, and lie between, Cat Island and Isle a Pitre. At its western end Cat Island Channel enters South Pass and Shell Bank Channel, both of which lead into Mississippi Sound. These channels, although marked by buoys and good for a depth of 14 feet, are little used except by small local craft of less than 8 feet draft, since $7\frac{1}{2}$ feet is about the deepest draft that can safely navigate the western end of Mississippi Sound. Occasionally a vessel of more than 8 feet draft will enter Cat Island Channel for anchorage; it is not advisable for a stranger to do this, except in clear weather and in the daytime. No vessel of over 13 feet draft should attempt to enter the channel.

There are several places in Cat Island Channel which afford good anchorage. Vessels of over 8 feet draft can anchor anywhere inside the Inside Bar buoy where the depth and bottom are suitable. Vessels of less than

CAT ISLAND CHANNEL—LAKE BORGNE.

8 feet draft will find good anchorage in *Spit Cove*, the deep cove just to the westward of the southeasternmost point of Cat Island. Or, they can anchor a little over $\frac{1}{2}$ mile *SW.* by *W.* from Cat Island Lighthouse. The local vessels passing through Cat Island Channel anchor anywhere when headed by the wind or upon the approach of darkness.

Prominent features.—Great Sand Hill is near the northeastern end of Cat Island; it is a high, white sand bluff, and the most conspicuous mark on the island. Cat Island Lighthouse (see table, page 14) is near the western point of the island and will hardly be seen until up to the Inside Bar buoy. Cat Island is thickly wooded nearly its whole length in an *E.* and *W.* direction; the eastern shore of the island extends in a general *SSW.* direction for $3\frac{1}{2}$ miles from Great Sand Hill and terminates in a low, narrow sand spit, which forms the northern point at the entrance to Cat Island Channel. Isle a Pitre, which is on the south side of Cat Island Channel, is low marsh with clusters of bushes scattered over the island and along the shore.

GENERAL DIRECTIONS, CAT ISLAND CHANNEL.

These directions are good for a draft of 13 feet to an anchorage in the channel, and for a draft of $7\frac{1}{2}$ feet to Lake Borgne. A stranger should not attempt to follow the directions except in the daytime and with clear weather.

Approaching the entrance to Cat Island Channel, keep in at least 18 feet of water until Ship Island Lighthouse is brought to bear *NE.* and Great Sand Hill, on Cat Island, bears *NNW.* From this position steer *W.* $\frac{1}{4}$ *N.* until the Inside Bar buoy is sighted, when the latter should be steered for. When up to the Inside Bar buoy leave it close-to on either hand and steer *NW.* by *W.* $\frac{3}{4}$ *W.* for 5 miles; on this course East buoy (nun, black and white perpendicular stripes) should be made ahead and left close-to, and Turn buoy (nun, black and white perpendicular stripes) should be made ahead. When up to the Turn buoy, leave it close-to and steer *SW.* by *W.* $\frac{1}{4}$ *W.* for about $5\frac{1}{2}$ miles; on this course, First and Second Channel buoys (nun, black and white perpendicular stripes) should be left close-to, and West buoy (nun, red, No. 2) should be made ahead. Leave West buoy on the starboard hand, and then:

If bound to Bay St. Louis, steer *NNW.* $\frac{3}{4}$ *W.*

If bound to Lake Borgne, steer *W.* $\frac{1}{2}$ *S.* for Lake Borgne Lighthouse (see table, page 14).

Remarks.—When Ship Island Lighthouse bears *NE.*, and Great Sand Hill (see description above) *NNW.*, Inside Bar buoy should be distant about $3\frac{1}{2}$ miles, bearing nearly *W.* $\frac{1}{4}$ *N.*; from this position to the buoy the least water should be about 15 feet. The channel is narrowest at East buoy; Cat Island Lighthouse bears *N.* by *W.* $\frac{1}{2}$ *W.* from this buoy, distant $2\frac{1}{2}$ miles. When standing for Turn buoy, Merrill Shell Bank Lighthouse (see table, page 14) should be sighted on the port bow. When standing on the *SW.* by *W.* $\frac{1}{4}$ *W.* course, a sharp lookout should be kept for the buoys, and care taken not to be set on the shoals to the northward.

LAKE BORGNE AND THE RIGOLETS.*

Lake Borgne is the easternmost of the three lakes which lie to the westward of Mississippi Sound and to the northward of the lower 150 miles of the Mississippi River; the two eastern of these lakes, Lake Borgne and Lake Pontchartrain, form the approach to the city of New Orleans from Mississippi Sound. Lake Borgne is about 22 miles long in a general *NE.* and *SW.* direction and varies from $5\frac{1}{2}$ to 14 miles in width; its general depth is 7 to 9 feet, and 8 feet is the deepest draft of any vessel entering. The shores of the lake are low and marshy and present no marked features; Lake Borgne Lighthouse (see table, page 14) is on the north shore, at the entrance from Mississippi Sound; about 5 miles to the westward of the lighthouse, on the north shore near the mouth of the East Pearl River, is English Lookout, a post village and the only settlement on the shores of the lake. Vessels entering Lake Borgne from the eastward generally pass through Grand Island Pass, which leads just south of Lake Borgne Lighthouse and north of Grand and Grassy islands; this pass has a greatest depth of about 7 fathoms, and the tidal currents in it are at times very strong.

Pearl River empties into Lake Borgne from the northward, its principal mouth, known as the East Pearl River, being about $3\frac{1}{2}$ miles to the westward of Lake Borgne Lighthouse; two other mouths of the Pearl River empty into The Rigolets. The river is quite narrow and crooked, but is navigable for light draft steamers a distance of 106 miles \dagger to Wheatfields, and, when the river is high, 340 miles \dagger farther to Edinburg. A draft of 8 feet can be taken 15 miles up the river to Gainsville and this is the deepest draft of the vessels that enter from Lake

* Shown on chart 191, scale $\frac{1}{80,000}$, price \$0.50; The Rigolets is also shown on chart 503, scale $\frac{1}{20,000}$, price \$0.20.

\dagger Distances estimated in statute miles.

Borgne; the usual draft is $5\frac{1}{2}$ to 6 feet. Pearlinton 9 miles, Logtown 12 miles, and Gainsville 15 miles, above the mouth of the river, are the principal places from which lumber and naval stores are shipped, mostly to New Orleans. A little over 1 mile above its mouth the East Pearl River is crossed by a railroad bridge—width of draw 60 feet. Strangers should not enter Pearl River without a pilot; persons competent to take vessels of 8 feet draft up the river can be found at English Lookout, at some of the towns on the north shore of Mississippi Sound, and at New Orleans.

The Rigolets is a deep passage, about 7 miles long and from 450 to 1,400 yards wide, connecting Lake Borgne with Lake Pontchartrain; it is the only passage through which masted vessels can pass from one lake to the other. Near its eastern end The Rigolets is crossed by a railroad bridge which has a draw with one opening about 60 feet wide; the passage of this draw is the most difficult navigation in The Rigolets. The tidal currents, which are very irregular and influenced greatly by winds, set very strongly through The Rigolets and especially through the draw of this bridge; the flood sets diagonally through the draw in a SW. direction and the ebb diagonally in a NE. direction; the direction of the draw is WNW. and ESE. About 1 mile above the bridge, on the south shore of The Rigolets, are an unused light tower, a special display station where wind signals are displayed, and the state quarantine station, where vessels entering Lake Pontchartrain are boarded. The shores on both sides are low and marshy; Fort Pike, which is a ruin, is on the south shore about 1 mile from the western entrance; and on the south point of the western entrance is West Rigolets Lighthouse (see table, page 14). In the north shore just above the bridge is one of the mouths of the Pearl River; this is not used, as there is a bar about $1\frac{1}{2}$ miles up the river over which the depth is only $3\frac{1}{2}$ feet. About $1\frac{1}{2}$ miles above the bridge, in the north shore, is the other mouth of the Pearl River, known as the West Pearl River; this is a narrow, crooked stream, good for any draft that can be taken to the villages on the Pearl River. Vessels can pass from Lake Borgne into the East Pearl River and then through the connecting waters to the West Pearl River, coming out in The Rigolets $1\frac{1}{2}$ miles above the railroad bridge.

Vessels can not make any headway beating against the currents in The Rigolets when they are at full strength, and it is impossible for a sailing vessel to pass through the draw in the bridge with an adverse current unless with a strong fair wind. When headed off by the wind or current, vessels can anchor anywhere near the shore where the depth is suitable, but should not anchor directly off any point; the southern shore is generally the better side for an anchorage. Although most of the obstructions have been removed from The Rigolets, a few stakes still show above water near the north shore, opposite Fort Pike.

For sailing directions through The Rigolets, see Sailing Directions, Lake Pontchartrain.

LAKE PONTCHARTRAIN AND TRIBUTARIES.*

Lake Pontchartrain is about 36 miles long in a general E. and W. direction and about 22 miles wide at its widest part; it is entered from the eastward through The Rigolets and is connected, at its western end, with Lake Maurepas through a narrow passage called Pass Manchac. The general depths in the lake range from 10 to 16 feet, but at its eastern end, near The Rigolets, and at the entrance to Pass Manchac are bars over which the least depth is about 6 feet. A draft of $8\frac{1}{2}$ feet can be taken into Lake Pontchartrain by a steamer when the water is high, but it requires local knowledge. The lake has considerable commerce; the vessels navigating it are small schooners and steamers of $5\frac{1}{2}$ to 7 feet draft, which trade between New Orleans and the towns on the lake and its tributaries and as far eastward as Mobile. Crossing Lake Pontchartrain, about $5\frac{1}{2}$ miles to the westward of The Rigolets, is a railroad bridge 5 miles long, in which there are two draws, one about 1 mile from the northern end of the bridge and the other about 1 mile from the southern end; the width in each of these draws is about 60 feet and their direction about WNW. and ESE. The southern draw is the one generally used; it bears NW. by W. $\frac{1}{2}$ W. from Pointe aux Herbes Lighthouse (see table, page 14).

The city limits of New Orleans extend from the Mississippi River to the south shore of lake Pontchartrain, but the business part of the city, which is nearer the river, is reached from Lake Pontchartrain through two canals which have their entrances between jetties built out into the lake. The easternmost and older of these canals is known as Bayou St. John; it has a depth of about $7\frac{1}{2}$ feet, is narrow and crooked, and is marked by a post-light. A summer resort consisting of several large buildings and known as Spanish Fort, is at the entrance to Bayou St. John. New Canal is $1\frac{1}{2}$ miles to the westward of Bayou St. John; it is marked at its entrance by a lighthouse (see table, page 14), is comparatively straight, and has a depth of about $7\frac{1}{2}$ feet; at its mouth is a popular summer resort known as West End; more vessels enter this canal than Bayou St. John. Both canals are crossed by a number of drawbridges, and sailing vessels usually employ a towboat when passing up and down. A little over 1 mile to the eastward of the entrance to Bayou St. John is the long railroad pier known as Port Pontchartrain; this pier, which is now seldom used, is marked near its end by a lighthouse (see table, page 14). A

* See footnote on page 82.

LAKE PONTCHARTRAIN AND TRIBUTARIES.

little over $\frac{1}{2}$ mile to the northward of the end of this pier, in the lake, are the remains of a line of piles which were intended to serve as a breakwater for vessels lying at the pier. The principal cargoes carried by the vessels trading to New Orleans through Lake Pontchartrain are lumber, cotton, naval stores, charcoal, firewood, garden produce, and oysters.

Mandeville, a post town on the northern shore of Lake Pontchartrain, is about 20 miles N. from New Orleans; it is the terminus of a railroad. There is little trade and vessels seldom go to Mandeville, as there is no harbor and they have to lie at the wharf built out into the lake.

There are no other cities, towns, or villages on the shores of Lake Pontchartrain. The shores are low and, except at the eastern end of the lake, are thickly wooded to the water's edge, or to within a short distance of it.

During the summer months the lake is subject to sudden, violent wind squalls from the northward, but vessels with good ground tackle can anchor anywhere in the lake where the bottom is soft and ride out the heaviest squalls.

The rise and fall of tides and the direction of the currents in the lake are influenced almost entirely by winds; the strongest currents will be found at the entrances to the canals, near The Rigolets and Pass Manchac, and in the mouth of Chefuncte River. The currents set diagonally through the southern draw in the bridge across the lake, but not so strongly as they do through The Rigolets.

CHEFUNCTE RIVER

empties into Lake Pontchartrain from the northward; it is the approach to the towns of Madisonville and Covington, and is, commercially, the most important tributary emptying into Lake Pontchartrain. The mouth of the river, which is obstructed by a bar having a depth of 6 feet in the channel over it, is marked by **Chefuncte River Lighthouse** (see table, page 14) on its west side; it lies about N. by W., distant about $21\frac{1}{2}$ miles, from the entrance to the New Canal at New Orleans. The river is navigable to Madisonville for vessels of 7 feet draft and this draft can be taken to within $1\frac{1}{2}$ miles of Covington. A number of schooners and steam barges are engaged in carrying cargoes between New Orleans and Madisonville and the landing below Covington; the usual draft of these vessels is 6 feet. **Madisonville** is on the west bank of the Chefuncte River about 3 miles above its mouth. **Covington** is on the west bank of **Bogue Falia**, a tributary of the Chefuncte River, and about 12 miles above Madisonville. There is a shipyard at Madisonville where repairs to wooden vessels can be made.

BONFUCA BAYOU

empties into Lake Pontchartrain from the northward; the entrance, which is obstructed by a bar that has a depth of about 4 feet over it, lies about $3\frac{1}{2}$ miles to the northwestward of the northern end of the long railroad bridge which crosses the eastern end of the lake. The two villages on the bayou and its tributary, **Bayou Vincent**, have some trade in lumber, brick, and tiles; vessels of $5\frac{1}{2}$ feet draft take cargoes from Bayou Bonfuca, but, as there are no aids, local knowledge is necessary for its navigation.

BAYOU LACOMBE

empties into Lake Pontchartrain from the northward; its entrance, obstructed by a bar over which the channel depth is about 3 feet, lies $7\frac{1}{2}$ miles to the northwestward of the northern end of the long railroad bridge. The bayou is the approach to the village of **Lacombe**. Cargoes of lumber, brick, and charcoal are shipped from the bayou to New Orleans in vessels of about 5 feet draft. There are no aids, and a knowledge of the bayou is necessary for its navigation.

TANGIPAHOA RIVER

empties into Lake Pontchartrain from the northward; its entrance, which is obstructed by a bar over which the depth is about 3 feet, lies about 10 miles to the southwestward of Chefuncte River Lighthouse. The river is of little importance; it is occasionally entered by a few vessels of about 4 feet draft which load with shells near the entrance.

PASS MANCHAC, LAKE MAUREPAS, AND TRIBUTARIES.

Pass Manchac is the passage connecting Lake Pontchartrain with Lake Maurepas; the pass is about 4 miles long and nearly straight, its general direction being about WNW. $\frac{1}{2}$ W. The entrance from Lake Pontchartrain is about 18 miles NW. from New Canal at New Orleans and is marked on its northern side by **Pass Manchac Lighthouse** (see table, page 14). Near its western end the pass is crossed by a railroad bridge which has a draw with a width of about 60 feet. At its eastern end, in Lake Pontchartrain, and at its western end, in Lake Maurepas, the pass is obstructed by bars on which logs have lodged, forming obstructions for vessels of

over 6½ feet draft; the local pilots state that even with the greatest caution vessels of 7 feet draft, the deepest draft taken through, are liable to strike the logs on the bars. The currents set through the pass, according to the direction of the wind, with considerable velocity.

LAKE MAUREPAS

is about 11 miles long in a **NE.** and **SW.** direction and about 7 miles wide at its widest part; at its northeastern end it is entered by Pass Manchac. The general depth of water in the lake is about 12 feet, and its shores are low and thickly wooded. There are no cities or towns on the shores of the lake, but its two principal tributaries, the Tickfaw and Amite rivers, have considerable trade to New Orleans passing through the lake.

TICKFAW RIVER

empties into Lake Maurepas from the northward; the entrance, which has a depth of 7 feet, is not marked and lies about 5 miles* to the westward of the western entrance to Pass Manchac. The river is crooked, but navigable to the town of Springfield, a distance of about 14 miles*, for vessels of 7 feet draft; considerable cotton and lumber is shipped from this town and the other landings on the river.

AMITE RIVER

empties into Lake Maurepas from the westward; the entrance, which is marked by Amite River Lighthouse (see table, page 14), lies about 8½ miles* **WSW.** from the western entrance to Pass Manchac.

The river, for vessels of 7 feet draft, is navigable a distance of 48 miles* and thence up Bayou Manchac, which is a tributary of the Amite, 10 miles* farther, to the village of Hope Villa. The principal towns on the river are Cllo, 8 miles,* and Port Vincent, 43 miles,* above the entrance. These towns, and a number of landings between them, ship considerable lumber, cotton, and naval stores to New Orleans in schooners and steamers which load to a draft of 7 feet. Local knowledge is necessary for entering and navigating the river and Bayou Manchac.

SAILING DIRECTIONS, THE RIGOLETS AND LAKE PONTCHARTRAIN TO NEW ORLEANS.

These directions are good in the daytime, with clear weather, for a draft of 6 feet at ordinary stages of the tide, and for a draft of 7 feet when the water is high in Lake Pontchartrain. It is advisable, however, for vessels of 7 feet draft, or more, to employ a pilot.

1. *From Lake Borgne Lighthouse to West Rigolets Lighthouse.*—Having followed the directions through Mississippi Sound or through Cat Island Channel, bring Lake Borgne Lighthouse to bear **N.**, distant about ½ mile; then steer **W.** by **S.** for nearly 1 mile. Bring the lighthouse to bear **NE. ¼ E.** over the stern and steer **SW. ¾ W.** for 4½ miles, until up to black can buoy No. 1, which should be left well on the starboard hand. From this buoy steer **WNW. ¾ W.**, heading fair for the entrance of The Rigolets. When between the points at the entrance to The Rigolets, the draw in the bridge will be opened; if there is any delay, give several blasts of steam whistle or fog horn. Pass through the draw (see the remarks following) and follow a mid-stream course until up to West Rigolets Lighthouse; then follow the directions in section 2.

Remarks.—On the **SW. ¾ W.** course, Grassy Island is left about ¾ mile on the port hand. The houses and long wharf at English Lookout will be left 2¼ miles on the starboard beam. The black can buoy, No. 1, should be left well on the starboard hand (it marks a wreck).

When on the **WNW. ¾ W.** course the bridge crossing The Rigolets should be directly ahead. In a sailing vessel with a light breeze great care is necessary when passing through the draw of the bridge, if the current is running strong. The draw (a single one) has a **WNW.** and **ESE.** direction and is protected by a fender of piles and timber on both sides; the westerly current sets in a **WSW.** direction on to the fender on the south side of the draw, and the easterly current sets in an **E. by N.** direction on to the fender on the north side of the draw. No sailing vessel can pass through the draw with an adverse current unless with a strong fair wind. Vessels waiting for a favorable opportunity to pass through the draw should anchor in Lake Borgne, just outside and to the southward of the entrance to The Rigolets; the depth in The Rigolets to the eastward of the bridge is too great for a small vessel to lie in.

After passing the bridge, the old light tower and quarantine station are left on the south shore; after they have been passed, the general direction is about **NW.** by **W. ¼ W.** for nearly 2 miles, then **SW.** by **W.** nearly 2¼ miles, when the entrance to Lake St. Catherine will be left on the port hand, the direction of the channel changing to **NW.** Abreast of Fort Pike the port hand shore should be slightly favored. When rounding West Rigolets Lighthouse the port hand shore can be approached close to; the only places where the shores should not be closely approached are off the point, on the north shore, which lies opposite the entrance to Lake St. Catherine and the north shore opposite Fort Pike.

* Distances estimated by pilots.

2. *From West Rigolets Lighthouse to the New Canal at New Orleans.*—After rounding West Rigolets Lighthouse follow the port hand shore, giving it a berth of about 700 yards, until Pointe aux Herbes Lighthouse bears **WNW. $\frac{1}{2}$ W.**; then steer **W. $\frac{1}{2}$ S.** so as to pass to the southward of red nun buoy No. 2; leave this buoy on the starboard hand and steer **NW. $\frac{1}{2}$ W.** until Pointe aux Herbes Lighthouse is well open to the left of the draw in the railroad bridge; then steer about **W. $\frac{1}{2}$ N.** for the draw and pass through either opening. From the draw in the bridge, a **SW. $\frac{3}{4}$ W.** course made good for 15 miles will lead to the entrance of the New Canal. To enter the New Canal, follow the directions in section 3.

Remarks.—The shoalest water will be found near red nun buoy No. 2. Care must be taken when passing through the draw of the bridge, as the currents set diagonally through it and are, at times, very strong. Standing on the **SW. $\frac{3}{4}$ W.** course, when New Canal Lighthouse is about $2\frac{1}{4}$ miles distant ahead, the remains of the breakwater off Port Pontchartrain should be seen on the port beam, distant about $\frac{1}{2}$ mile.

3. *Entering New Canal.*—Stand for the lighthouse, and when it is about $\frac{1}{4}$ mile distant bring it to bear **WSW.**; steer for it on this bearing and pass into the entrance of the canal, leaving the lighthouse on the port hand, and turning sharply to the southward when abreast of it. Vessels may make fast to the eastern bank of the canal inside the lighthouse, but the western bank must be kept clear for entering vessels to haul along.

Remarks.—The lighthouse is built on the end of the eastern jetty; the western jetty takes a sharp turn to the eastward outside of the eastern jetty and forms a breakwater for the entrance. The distance between the jetties is about 100 feet, and the canal bank and jetties are protected by a timber revetment. At times there is a strong current setting in or out of the canal; in either case, it has a tendency to set vessels against the western bank of the canal in the turn abreast the lighthouse. A towboat will tow vessels up or down the canal at intervals during the day.

CHANDELEUR AND BRETON SOUNDS.*

Chandeleur and Breton sounds are the names applied to a shallow body of water lying to the northward of the Mississippi River delta and just to the southward of Mississippi Sound at Cat and Ship islands. The northern part is known as Chandeleur Sound and lies to the westward of the Chandeleur Islands, a chain of narrow, low islands beginning 10 miles to the southward of Ship Island and extending in a general S. by W. direction for a distance of 23 miles; on the NW. extremity of the most northerly of the Chandeleur Islands is Chandeleur Lighthouse (see table, page 14). The western shore of the sound is low marsh broken by numerous islands and bayous. To the southward of Chandeleur Sound is Breton Sound; the line of demarcation between the sounds has never been closely defined, but Breton Sound comprises the water lying to the westward of Errol and Breton islands, its western shore being low marsh broken by islands and bayous. These sounds are of little commercial importance, although a least depth of 11 feet can be taken through by following a track marked by several buoys. Small vessels bound from the passes of the Mississippi River to Mississippi Sound, or Lake Borgne, will find smoother water by using the route through the sounds than if passing to the eastward of the Chandeleur Islands.

SAILING DIRECTIONS, CHANDELEUR AND BRETON SOUNDS.

These directions are good in the daytime, with clear weather, for a draft of 10 feet.

Passing through from the Northward.—With Chandeleur Lighthouse bearing **E.** by **N.**, distant 3 miles, make good a **S.** by **W. $\frac{3}{4}$ W.** course for $17\frac{1}{2}$ miles. Or, bring Chandeleur Lighthouse to bear **NNE. $\frac{1}{4}$ E.**, distant $1\frac{1}{2}$ miles, over the stern and make good a **SSW. $\frac{1}{4}$ W.** course for $17\frac{1}{2}$ miles. These courses lead to the black and white perpendicularly striped nun buoy which lies $1\frac{1}{4}$ miles to the westward of Old Harbor Islands. From this buoy, which should be left close-to, make good a **S. $\frac{3}{4}$ W.** course for 17 miles, which will lead to the black and white perpendicularly striped buoy which lies about $1\frac{1}{4}$ miles to the eastward of the north point of Breton Island. From this buoy steer **S.** by **W.** for $5\frac{1}{4}$ miles, leaving Middle buoy (nun, black and white perpendicular stripes) close-to; when up to South buoy (1st class nun, black and white perpendicular stripes), which should be left close-to, make good a **SE. $\frac{1}{4}$ S.** course for 15 miles; Pass a Loutre Lighthouse should then bear **SW. $\frac{1}{4}$ W.** and be distant about 3 miles.

* Shown on charts 190, 192, scale $\frac{1}{80,000}$, price of each \$0.50.

Remarks.—The buoys are the only reliable guides for a stranger. On the **SSW. $\frac{1}{2}$ W.** course, the northernmost of the **Freemason Islands** and the westernmost of the **Old Harbor Islands** should be left $1\frac{1}{2}$ miles on the port hand; these islands are low and offer no distinguishing marks.

On the **S. by W. $\frac{3}{4}$ W.** course, the northernmost of the **Freemason Islands** should be left 2 miles on the port hand.

On the **S. $\frac{3}{4}$ W.** course, **Breton Island** will be made on the starboard bow and should be left $1\frac{1}{2}$ miles on the starboard hand. There are three black and white perpendicularly striped nun buoys which mark the channel to the eastward of **Breton Island**.

On the **SE. $\frac{1}{4}$ S.** course, **Pass a Loutre Lighthouse** should be made well on the starboard bow; this lighthouse should in no case be approached closer than $2\frac{1}{4}$ miles on any bearing. When approaching the delta of the **Mississippi River**, it is a good rule not to shoal the water to less than 10 fathoms.

To pass through *Chandeleur and Breton sounds from the southward*, reverse the directions given above, first bringing **Pass a Loutre Lighthouse** to bear **SW. $\frac{3}{4}$ W.**, distant $2\frac{1}{4}$ miles.

THE PASSES OF THE MISSISSIPPI RIVER AND PORT OF NEW ORLEANS.*

The **Mississippi River** empties into the northern part of the **Gulf of Mexico** through several mouths, or passes, which begin to diverge at a point about $11\frac{1}{2}$ to 15 miles from where they empty into the gulf, and which form what is known as the delta of the **Mississippi**; this delta is included between longitudes 89° W. and $89^{\circ} 25'$ W. and latitudes $28^{\circ} 55'$ N. and $29^{\circ} 14'$ N. The delta is nearly fan-shaped, covering about 127° of arc from the Head of the Passes; the length of the arc is about 33 miles, with its least radius near the middle.

Pass a Loutre, the northeasternmost of the passes, has two mouths separated from each other by the **Middle Ground**, on the southern end of which is **Pass a Loutre Lighthouse** (see table, page 14), marking the principal entrance to the pass. This entrance is obstructed by a shifting bar across which there is a depth of about 9 feet in the channel. The outer buoy at the entrance merely indicates the vicinity of the bar and no stranger should attempt to enter before having sounded out the channel. Only local vessels of less than 7 feet draft use this pass. **North Pass**, the other mouth of **Pass a Loutre**, is not navigable. About 5 miles below the Head of the Passes, **Southeast Pass** branches off to the southeastward from **Pass a Loutre**. **Southeast Pass** has a branch called **Northeast Pass**, both emptying into the gulf, but, as the shifting bars at their entrances are not marked, they are used only by small local craft. These passes all have good water for a distance of more than 10 miles below the Head of the Passes.

Southwest Pass is the westernmost of the passes; it is marked by **Southwest Pass Lighthouse** (see table, page 16) and an old light tower, $\frac{1}{2}$ mile to the northward, on its western bank and by a tall framework (pilot's lookout) on its eastern bank; these serve to mark the pass so that it can not be mistaken in clear weather when approached from any direction. The pass, at its entrance, is obstructed by a shifting mud bar which has a depth of 10 to 12 feet in a narrow channel marked by four buoys. Only small coasting schooners enter the pass; from the lighthouse up to the Head of the Passes the channel depth ranges from $3\frac{1}{2}$ to 12 fathoms.

South Pass, the entrance to which is in Latitude $28^{\circ} 59' 25''$ N., Longitude $89^{\circ} 08'$ W., is the commercial entrance to the **Mississippi River** from the **Gulf of Mexico**. It has been improved by the construction of jetties, and a least depth of 26 feet is supposed to be maintained through the whole length of the pass in a channel at least 300 feet wide. The entrance between the jetties is marked by lighthouses and a lighted range, and, for 8 months of the year, a light-vessel is moored $1\frac{1}{4}$ miles to the southeastward of the entrance. **South Pass Lighthouse** (see table, page 16) is on the west bank of the pass $2\frac{1}{4}$ miles above the ends of the jetties, and opposite, on the east bank, is **Port Eads**, a post office and headquarters for the construction force employed in the improvement of the pass. From the ends of the jetties to the Head of the Passes the distance is $11\frac{1}{4}$ miles and the least width between banks is about 500 feet. The depth of water just outside the entrance is continually changing and "mud lumps" forming, but a depth of over 10 fathoms can be taken within $1\frac{1}{4}$ miles of the ends of the jetties with the lighthouse on the east jetty bearing anywhere between **NE.** and **W.**, through **N.** The deepest draft of vessels entering **South Pass** is 25 feet; all sailing vessels require the assistance of a towboat for entering. Gales do not prevent vessels from entering when a pilot is on board.

From the Head of the Passes to the city of **New Orleans**, a distance of 84 miles, the river has a least width of 600 yards and a clear, unobstructed channel with depths of from 6 to 39 fathoms. The land on both sides of the river is low and generally marshy; below forts **Jackson** and **St. Philip**, which are 17 miles above the Head of the Passes, willows have been planted on both banks to assist in preserving them; above the forks the bank on both sides of the river is protected by dikes (called levees) to prevent floods when the river is high. The land back of the levees is laid out in sugar and rice plantations and is considered one of the richest agricultural

* Shown on charts 194, 195, scale $\frac{1}{80,000}$, price of each \$0.50.

districts in the United States. A sailing vessel bound up the river should employ a towboat, as the river is crooked and the current too strong to make any headway against it, except with a strong fair wind. Freshets, which occur from April to July, do not interfere with the navigation of the river.

New Orleans is on the north bank of the river, 95½ miles above the ends of the jetties; it has a large foreign and coastwise trade and also a large river trade. The deepest draft of the vessels leaving the port is 25 feet and the general draft about 20 feet. New Orleans has also a large trade through the canals which enter it from Lake Pontchartrain (see page 83).

Abreast New Orleans, on the opposite bank of the river, are the towns of **Gretna** and **Algiers**; the latter is the terminus of two important railroads, and all the principal shipyards and docks for hauling out vessels are located there. Both Gretna and Algiers are connected with New Orleans by ferries.

Canals.—There are two canals near the city of New Orleans, and one about 45 miles below the city, which connect the Mississippi River with the bayous and interior waters lying to the westward, of which the principal outlet to the Gulf of Mexico is through Barataria Bay. **Tagliaferro (Socola) Canal**, which is 45 miles below New Orleans, has one lock about 60 feet long at its river entrance and a depth of about 5 feet. **Harveys Canal**, which is opposite New Orleans and at the upper part of Gretna, has no locks; the depth in the canal is 5 to 6 feet. **Company Canal** is about 3½ miles above Harveys Canal; it has no locks; the depth is 5 to 6 feet. These canals are used only by small, light draft steamers and luggers, the principal articles carried being general merchandise to the fishermen's settlements, and game, fish, and oysters for market in New Orleans on the return trip.

GENERAL INFORMATION.

Prominent features.—The lighthouses are the most prominent and easily recognized marks on shore at the entrances to the passes. The land is low marsh covered with tall, coarse grass and reeds. **South Pass Light-vessel** (see table, page 14), during eight months of the year (October to May inclusive), and the smoke from steamers in and near the mouth of South Pass, should prevent a stranger from mistaking this pass for any other. The discolored water discharged from the Mississippi River is one of the first intimations of the proximity of land to mariners approaching the passes; this, however, can not be depended on to indicate distance, for with a high river and northerly winds discolored water will be met in some directions from 40 to 60 miles, and even farther, from land, and the water will appear broken from 15 to 20 miles from the passes.

Anchorage.—Vessels desiring to anchor in South Pass will conform to the "Rules for the navigation of South Pass" in Appendix I. Between the Head of the Passes and the city of New Orleans vessels can anchor anywhere, on either side of the river, where the depth of water and character of the bottom are favorable; the best anchorage is on the west side of the river off **Slaughter-house Point**. Merchant vessels seldom anchor above Slaughter-house Point except when taking in grain from barges off the elevator above the city. Naval vessels usually anchor above Canal Street, favoring the western bank.

Quarantine.—The quarantine station is on the west bank of the river just above **The Jump** and 9½ miles above the Head of the Passes. All vessels subject to visitation by the health officer are boarded when off the station (see Appendix I, and National Quarantines, Appendix IV).

Pilots.—There are two kinds—bar pilots and river pilots. The bar pilots are always on the lookout and will come out from between the jetties in a steam pilot boat to board approaching vessels as soon as they are sighted. The river pilot is taken on board at the **Head of the Passes**, where the bar pilot leaves the vessel. The rates for river pilotage are \$15 to \$20 each way and do not depend on the draft of the vessel. Pilotage is compulsory (see pilot laws, and rates, Appendix I).

Towboats are used by all sailing vessels entering South Pass; they will usually be found cruising outside, or, will come out from the jetties on sighting an approaching vessel. Towboats can always be had at New Orleans.

Lines inside of which the "**Rules of the Road**" for harbors, rivers, and inland waters, etc., are to be followed:—
"From South Pass East Jetty Lighthouse N. by E. ½ E. to Pass a Loutre Lighthouse, thence N. to Errol Island and from South Pass East Jetty Lighthouse W. ½ S. to Southwest Pass Lighthouse, thence N. to shore."

Wharves.—The whole system of wharves and embankments at the city of New Orleans is known as "**The Levee**." The contract of the wharf lessees with the city requires not less than 20 feet of water at the levee at all times. (See extracts from the City Ordinances, Appendix I.)

Supplies.—Coal, bituminous or anthracite, can be had for steamers anywhere alongside the levee in wheelbarrows, and in the stream from coal barges. A limited quantity of coal is usually kept near Port Eads. Water is taken from the river abreast of New Orleans. Provisions and ship chandler's stores can be obtained in the city.

Repairs.—The facilities for repairs to hulls of vessels and machinery of steamers are excellent. There are four floating docks; the largest is 250 feet in length, has a capacity of 1,500 tons, and can take on a vessel of 14 feet draft. The other docks have lengths of 204, 200, and 150 feet, respectively. Under an agreement among the dry dock companies, there is one scale of prices for docking, labor, and material at all the docks and ship-yards controlled by the New Orleans Dry Dock Union.

A branch of the United States Hydrographic Office, subordinate to the Navy Department, is located in the customhouse. Bulletins are posted here giving information of value to seamen, who are also enabled to avail themselves of publications pertaining to navigation, as well as to get chronometer comparisons, and to correct their charts by standards. No charge is made for this service.

A time ball is dropped daily, except Sundays, on the roof of the Cotton Exchange building, exactly at noon of the 75th meridian, or one hour before noon of the 90th meridian, that is, at 5h. 00m. 00s. of Greenwich mean time. This instant of time is marked by the beginning of the fall of the ball. The ball is dropped by electric signal from the United States Naval Observatory, in accordance with arrangements made under the authority of the Navy Department. It is hoisted five minutes before 11 o'clock, standard time; in case of no signal the ball is lowered after 11h. 05m. 00s. A. M., standard time.

Wind Signals of the United States Weather Bureau are displayed at the special wind signal display station at Port Eads, and on the customhouse at the city of New Orleans. The former can be seen by vessels entering or leaving the jetties, and the latter when abreast of the city near Canal street.

The United States Marine Hospital Service has a hospital at New Orleans for the treatment of seamen (see Appendix IV).

Fogs.—There is considerable fog both inside and off the mouth of the river from March to June; southerly and easterly winds bring it in and northerly and westerly winds clear it away.

Tides and currents.—There is no noticeable tide at New Orleans. In the passes there is generally but one high and low water in 24 hours (see table, page 21, and remarks on page 23). The condition of the river, whether high or low, also affects the tides; so that, for purposes of navigation, they are rarely taken into account. The extreme difference of level at New Orleans between high and low stages of the river is 17½ feet and the mean difference from 10 to 12 feet, the river usually being high from April to July. The tides do not affect the current of the river, its strength in the river and through the passes depending on the height of the river. At times counter currents are met with in the lower part of the river, near the banks, and these are taken advantage of by the boats and small vessels trading on the river.

GENERAL DIRECTIONS, SOUTH PASS TO NEW ORLEANS.

The following directions are good for steamers up to 18 feet draft. Steamers of deeper draft should take a pilot, and all sailing vessels should employ a towboat.

Approaching the Entrance to South Pass, a vessel should not shoal her water to less than 30 fathoms unless sure of her position. As soon as South Pass Lighthouse, or South Pass Light-vessel, is made, bring the former to bear **NW. ½ W.** and steer for it, or, steer for the latter on any bearing to the northward of **NE.** and **SW.** When about 1 mile from the ends of the jetties, bring the red beacon, which is on the west jetty and about 575 yards inside of West Jetty Lighthouse, in range with South Pass Lighthouse. Stand in on this range, course **NW. ¾ W.**; leave the inside corner of the east jetty about 150 feet on the starboard hand and keep on the range until midway between the east and west jetties; then follow a mid-channel course through South Pass and up the Mississippi River to New Orleans.

Remarks.—If it is clear no difficulty should be experienced in entering and passing up to New Orleans at night. (For a list of aids see table, pages 14, 16.) The front beacon shows a fixed white light; the easiest way to find this light is to first get the fixed red light on the end of the east jetty in range with South Pass Lighthouse; the front range light will then show a little to the left of East Jetty Light, and West Jetty Light will be still farther to the left. At times the current sets very strongly through the ends of the jetties and a vessel should keep head to it so as not to sheer out of the channel. When in the pass the banks are a sufficient guide, care being taken to keep about midway between them.

COAST BETWEEN SOUTHWEST PASS AND ATCHAFALAYA BAY.*

The distance in a straight line from Southwest Pass Lighthouse to Southwest Reef Lighthouse, at the entrance to Atchafalaya Bay, is 118 miles; but following the curves of the coast the distance is about 140 miles. This stretch of coast is low and broken by numerous passes which lead from the gulf to the network of bays.

* Shown on charts 197, 198, 199, scale $\frac{1}{80,000}$, price of each \$0.50.

and bayous which traverse the country to the westward of the Mississippi River. These inland waters are navigable only for small, light draft vessels. There are no towns along the coast, and no harbors that can be used by vessels of over 8 feet draft, even under favorable conditions. The only anchorage for vessels of 18 feet draft is to the northward of **Ship Shoal**; this shoal, including several detached spots, is about 25 miles long in a general E. and W. direction, with depths ranging from 5 to 18 feet; for $6\frac{1}{2}$ miles of its length it has a depth of less than 12 feet. Its northern edge is about 7 miles from the shore and rises abruptly from a depth of about $4\frac{1}{2}$ fathoms; **Ship Shoal Lighthouse** (see table, page 16), near the northern edge of the shoal and about 17 miles from its eastern end, bears W. $\frac{1}{2}$ S., distant 88 miles, from Southwest Pass Lighthouse and SE., distant $36\frac{1}{2}$ miles, from Southwest Reef Lighthouse. The best anchorage in southerly gales is near the edge of the bank to the northward of the lighthouse; here the depth is from 4 to 5 fathoms and the holding ground good, the shoal breaking the sea so that vessels with good ground tackle can ride out a gale. In northerly gales ships can anchor to the northward of Ship Shoal and as close as their draft will permit to the southward of the extensive shoals that make off from the shore near **Caillou Bay**; the holding ground is good and the shoals prevent a heavy sea.

The coast between Southwest Pass and **Grand Pass**, into Barataria Bay, is low and marshy with soft mud shoals making off from the shore; there are no settlements, and it is never approached by seagoing vessels unless by mistake. Vessels bound to New Orleans sometimes fall to the westward of the Mississippi River delta, but this fact can be quickly discovered by using the lead, as the water shoals much more gradually along this part of the coast than off the delta.

Barataria Bay is described under a separate heading.

Caminada Pass, the entrance from the gulf to **Caminada Bay**, is $36\frac{1}{2}$ miles WNW. $\frac{1}{2}$ W. from Southwest Pass Lighthouse and about 7 miles to the southwestward of Barataria Bay Lighthouse. The pass has a depth of 5 feet on the bar and about 4 feet inside.

Pass Fourchon and **Raccoon Pass**, which lie 16 and $20\frac{1}{2}$ miles, respectively, to the southwestward of Barataria Bay Lighthouse, have depths of 2 to 3 feet only on the bars at their entrances.

Grand Pass Timbalier is 50 miles W. from Southwest Pass Lighthouse and 39 miles ENE. + E. from Ship Shoal Lighthouse; this pass is the principal entrance from the gulf to **Timbalier Bay** and its tributaries, and has a depth of 8 feet in the channel over the bar. There is a good anchorage with a depth of 8 to 10 feet just inside the entrance, but the ruling depths in the bay are 4 to 8 feet. A lighted beacon (see table, page 16), on the western side of the entrance, is the only aid for entering.

Caillou Pass is 8 miles to the westward of Grand Pass Timbalier; it has $6\frac{1}{2}$ feet of water in the channel over the bar and good anchorage inside the pass in 14 to 23 feet of water.

Cat Island Pass is about $3\frac{1}{2}$ miles to the westward of Caillou Pass; it has 12 feet on the bar but there is only 8 feet of water at the anchorage and only from 4 to 8 feet in Terrebonne Bay, to which this pass is the principal entrance.

Wine Island Pass is about $4\frac{1}{2}$ miles to the westward of Cat Island Pass and 24 miles NE. by E. $\frac{1}{2}$ E. from Ship Shoal Lighthouse; the pass has about 9 feet of water on the bar and 8 feet at the anchorage inside.

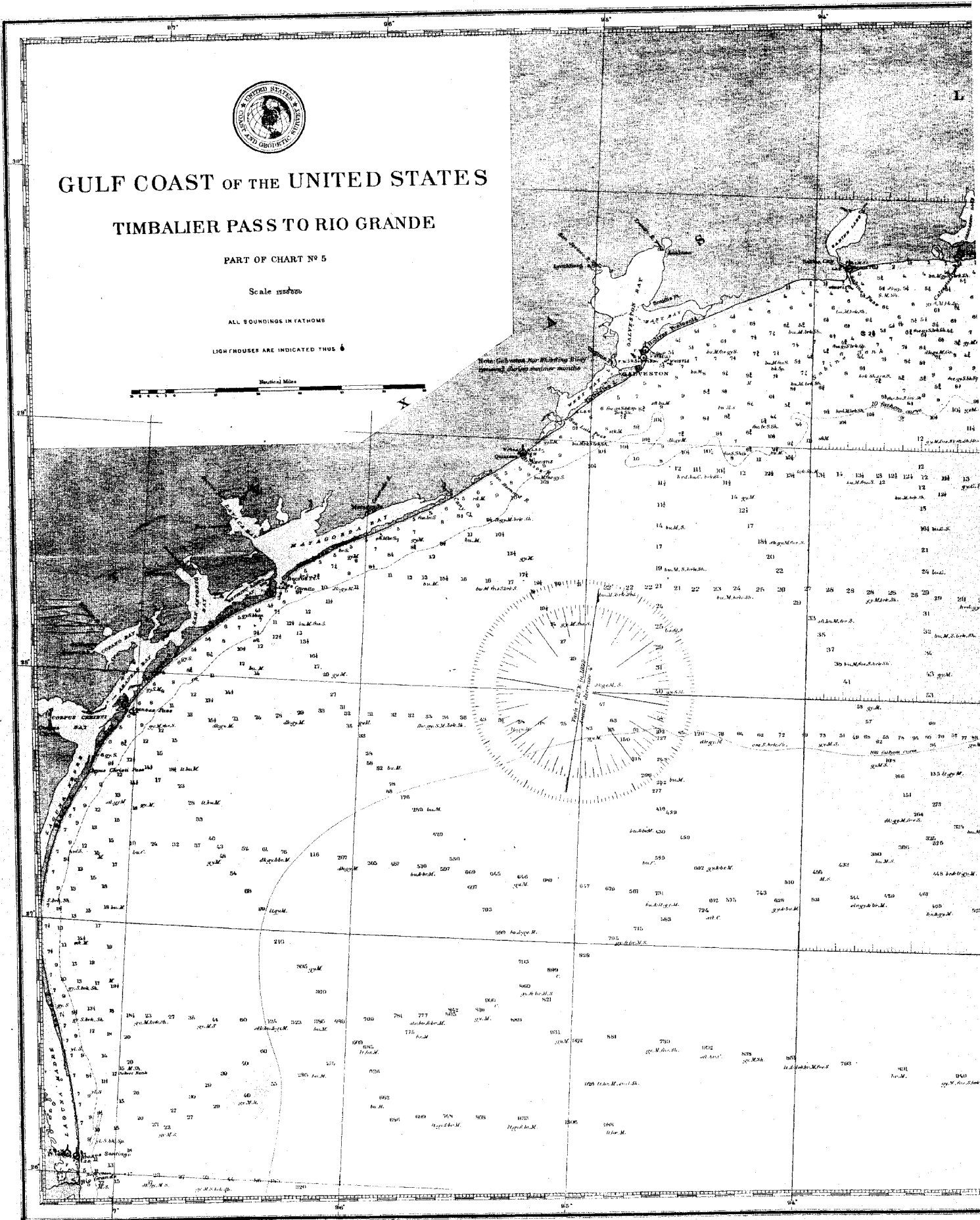
Caillou Bay is a large, shallow bight having depths of 5 to 6 feet and lying to the northward of the western end of **Derniere Island**. There is a good anchorage in 10 feet of water just inside of and close to **Raccoon Point**, the western point of **Derniere Island**, which can be used by vessels of about 7 feet draft, this being the deepest draft that can be taken in over the shoals to the southwestward of the point. **Caillou Bayou** empties into the gulf due north from **Raccoon Point**; it has a depth of about 5 feet on the bar at its entrance.

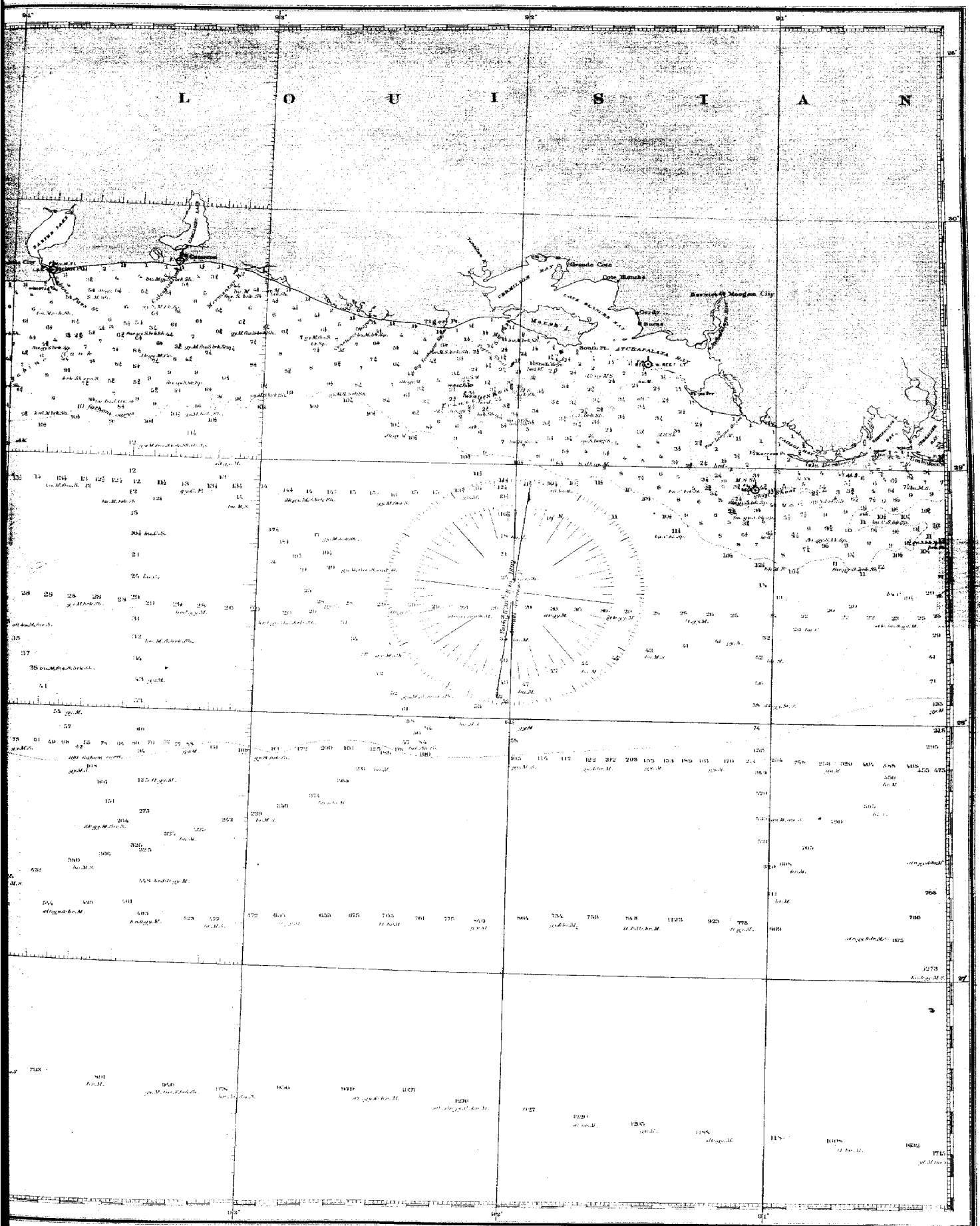
The above passes and anchorages are entirely useless to a stranger; the depths are changeable and there are no aids that would be of use to anyone except those familiar with the changes which are taking place along the coast.

BARATARIA BAY *

is a large, shallow body of water lying 35 miles to the northwestward of Southwest Pass Lighthouse; its entrance, known as **Grand Pass**, is marked on its eastern side by **Barataria Bay Lighthouse** (see table, page 16). The bay has a general depth of 4 to 5 feet and is frequented only by fishermen and oystermen; the carrying is done in steamers and luggers of 8 to 4 feet draft, which trade to New Orleans through the bayous and canals connecting the bay with the Mississippi. The only post office in this vicinity is **Grand Isle**, nearly 3 miles to the westward of Grand Pass. Near the lighthouse, on the east side of the pass, is **Fort Livingston**, which shows prominently when approaching the entrance from the gulf.

* The entrance and lower part of the bay are shown on chart 512, scale $\frac{1}{40,000}$, price \$0.30.





A bar, through which the best water is about 7 feet, extends about $2\frac{1}{2}$ miles off the entrance; at high water there is about 8 feet, but it is not safe for a vessel of over 5 feet draft to attempt entering if there is any swell. Between the points at the entrance and just inside there is good anchorage with depths of from 2 to 8 fathoms. No stranger should attempt to enter Barataria Bay, as the bar shifts and there are none but local aids.

GENERAL DIRECTIONS, ENTRANCE TO BARATARIA BAY.

The following directions lead to the bar off the entrance, but no stranger should attempt to enter without a pilot, or without first sounding out the channel. The deepest draft that can safely be taken in under the most favorable conditions is 7 feet.

*With Southwest Pass Lighthouse bearing **NNE.**, distant $3\frac{1}{2}$ miles, steer **NW.** by **W.** $\frac{3}{4}$ **W.** for 32 miles; Barataria Bay Lighthouse should then bear **NW.**, distant 3 miles, and the depth should be 4 fathoms.*

*Coming from the westward alongshore, follow the beach, giving it a berth of $2\frac{1}{2}$ miles until Barataria Bay Lighthouse is made bearing a little to the eastward of **N.**; then haul offshore and bring the light to bear **NW.**, distant 3 miles.*

Remarks.—The bar at the entrance is hard sand and when there is any swell it is dangerous for a vessel to attempt to enter.

ATCHAFALAYA BAY AND RIVER.*

Atchafalaya Bay is a large, shallow bight in the coast of Louisiana about 112 miles to the westward of Southwest Pass Lighthouse and about 37 miles to the northwestward of Ship Shoal Lighthouse; the entrance is marked by **Southwest Reef Lighthouse** (see table, page 16). The bay is of no importance except as an approach to the Atchafalaya River and the town of Morgan City; it is full of shoals and oyster reefs through which the Morgan Steamship Company has dredged a channel with a depth of 9 feet, but this depth has shoaled in some places to about 8 feet and at the entrance, where it leads through **White Shell Reef**, it has shoaled so as not to be navigable for strangers; the least depth outside of this channel is about $6\frac{1}{2}$ feet, and local knowledge is necessary to carry it through the bay and into Atchafalaya River. The approach to the bay from the Gulf of Mexico is shoal, the 10-fathom curve being nearly 30 miles from the shore, and shoals with 13 to 18 feet of water over them are found 23 miles offshore to the southwestward of Southwest Reef Lighthouse. The deepest draft vessels entering the bay draw 8 feet and these are steamers of the Morgan Line which run to Morgan City. The sailing vessels entering are never over 7 feet draft, and with this draft it is necessary to employ a towboat to pull the vessel through the soft mud when she runs aground.

Atchafalaya River empties into the head of Atchafalaya Bay from the northward; it is the outlet of numerous bayous and several lakes; when there are freshets in the rivers the water in Atchafalaya Bay is quite fresh and that in Cote Blanche bays nearly so. The bayous and lakes emptying into the river form a passage to the Mississippi River and to New Orleans which is good for steamers of 3 feet draft all the year; during high water 8 feet can be taken through. The river from the bay to Morgan City, a distance of 16 miles, has a crooked but deep channel, the depth in places being 20 fathoms and more.

Morgan City, a small town on the east bank of the river, is about 31 miles from Southwest Reef Lighthouse. The town is the only one between New Orleans and Sabine Pass having railroad communication which can be reached by vessels of 8 feet draft from the Gulf of Mexico; it has some trade in lumber, but the Morgan Line steamers which run between Morgan City, Brazos, and Galveston, are the only vessels engaged regularly in trade to the gulf.† Steamers run irregularly up the river to landings on the bayous and to the Mississippi River and down the river to Cote Blanche and Vermilion bays; these steamers, however, are only of 3 to 6 feet draft. A railroad drawbridge crosses the river at Morgan City.

Berwick is a village opposite Morgan City; it has a shipyard, where minor repairs to the hulls of vessels can be made.

Prominent features.—Southwest Reef Lighthouse is the only aid easily recognized by a stranger; the coast to the eastward and westward is low and marshy and presents no natural features that can be recognized by a stranger. On the north shore of the bay and bearing **NNE. $\frac{1}{4}$ E.** from the lighthouse is **Belle Isle**; this is said to be the highest land on the coast of Louisiana, but the lighthouse will be sighted as soon as this land by vessels approaching the entrance.

Channels.—The channel usually followed by vessels leads to the eastward of the lighthouse, and is marked by several buoys to its junction with the dredged channel of the Morgan Steamship Company; the navigable portion

* Shown on charts 199, scale $\frac{1}{80,000}$, price \$0.50; 516, scale $\frac{1}{50,000}$, price \$0.25.

† It is said that this line of steamers will discontinue running to Morgan City.

of the dredged channel begins $3\frac{1}{2}$ miles **NE.** from the lighthouse; it extends in a straight line about **ENE. $\frac{1}{2}$ E.** for a distance of $7\frac{1}{2}$ miles and is marked by stakes. A depth of 9 feet can be taken into the dredged channel, but the latter, which originally had a depth of 9 feet, has shoaled somewhat, and in places steamers have to force themselves through 1 to 2 feet of soft mud. The channel above the dredged channel has widths varying from $\frac{1}{2}$ to $\frac{3}{4}$ mile up to Morgan City; it follows a general mid-river course and is very deep. During freshets, when the banks of the river are covered and the current is strong, it is a difficult matter to keep in the channel. There are no aids of use to a stranger above the dredged channel.

Anchorage.—There is good anchorage anywhere in the bay where the depth is suitable. Vessels seldom anchor in the river, unless obliged to do so, on account of the depth and current, though the bottom is good holding ground.

Quarantine.—The boarding station is about 1 mile below Morgan City; all vessels are obliged to stop here until given pratique. (See quarantine, Appendix I, and National Quarantines, Appendix IV.)

Pilots and towboats.—There are no regular pilots; a vessel desiring a pilot should anchor near the lighthouse and send a boat up to Morgan City for some one acquainted with the channel to take her in. Sailing vessels should employ a towboat; one may be had at Morgan City.

Supplies.—A limited amount of bituminous coal, and fresh water through pipe and hose, can be obtained alongside the wharf at Morgan City. Provisions can be had in the town.

Wharves.—The Morgan Steamship Company has a good wharf at Morgan City at which the depth of water is 20 feet.

Freshets are frequent in May and June but they do not affect the vessels moored at the wharf at Morgan City.

Fogs are most frequent in January and February; southerly winds bring it in and northerly winds clear it away.

Tides and currents.—The rise and fall of tides depend greatly on the force and direction of the winds, which influence the current also to a marked degree. During freshets the current in the river is very strong and the current in the bay is influenced by it; the discolored water coming out of the river will be encountered well offshore, the distance depending much upon the direction of the wind. (See table, page 21, and remarks on tides, page 23.)

SAILING DIRECTIONS, ATCHAFALAYA BAY AND RIVER TO MORGAN CITY.

The following directions are good in the daytime, with clear weather and when there are no freshets, for steamers of about $7\frac{1}{2}$ feet draft. No sailing vessel or steamer of over $7\frac{1}{2}$ feet draft should attempt to enter without a pilot. No vessel should attempt to enter at night.

1. Approaching from the Eastward.—With Southwest Pass Lighthouse bearing **NNE.**, distant $3\frac{1}{2}$ miles, make good a **W. $\frac{3}{4}$ S.** course for $93\frac{1}{2}$ miles, passing $2\frac{1}{2}$ miles to the northward of Ship Shoal Lighthouse. When this lighthouse bears **ESE. $\frac{1}{2}$ E.**, distant 8 miles, steer **NW. $\frac{3}{4}$ N.**, which course should lead directly for Southwest Reef Lighthouse at the entrance to Atchafalaya Bay. When Southwest Reef Lighthouse is about 1 mile distant and bearing anywhere between **NE.** and **NW.**, follow the directions in section 2.

Remarks.—The **W. $\frac{3}{4}$ S.** course from off Southwest Pass leads 6 miles to the southward of Timbalier Light, $4\frac{1}{2}$ miles to the southward of Isle Derniere, and a little over 2 miles to the northward of the northern edge of Ship Shoal.

The **NW. $\frac{3}{4}$ N.** course leads in 12 to 18 feet of water across the extensive shoals which make out from the shore between Caillou and Atchafalaya bays. Southwest Reef Lighthouse should be made when it is 7 miles distant.

1 A. Approaching from the Westward.—Standing along the coast to the eastward of Galveston Entrance, give the beach a berth of $2\frac{1}{2}$ miles. Follow the beach at this distance until 66 miles to the eastward of Calcasieu Lighthouse; Southwest Pass, the entrance to Vermilion Bay, will then bear **NE.**, distant about 4 miles. From this position steer **SE.** by **E.** for $16\frac{1}{2}$ miles and leave a red can buoy on the port hand. From this buoy make good an **E. $\frac{1}{2}$ N.** course for 9 miles, until Southwest Reef Lighthouse bears **NW.**, distant 1 mile; then follow the directions in section 2.

Remarks.—The coast between Galveston Entrance and Atchafalaya Bay presents no marked natural features. The shoals which commence at Tigre Point and extend alongshore to the entrance of Atchafalaya Bay are generally soft; in crossing these shoals the lead should be used frequently, as there are spots with from 4 to 8 feet of water over them lying from $4\frac{1}{2}$ to $11\frac{1}{2}$ miles offshore, just to the westward of Vermilion Bay entrance. The Shell Keys, which extend to the southward 5 miles from the southern point of Marsh Island, should be given a wide berth. The entrance to East Cote Blanche and Atchafalaya bays is full of shoals and oyster shell reefs and a vessel should not shoal her water to less than 11 feet until Southwest Reef Lighthouse is made and stood for.

2. From Southwest Reef Lighthouse to Atchafalaya River Entrance.—Bring Southwest Reef Lighthouse to bear **NW.**, distant 1 mile, and steer **NNW. $\frac{3}{4}$ W.**, leaving the lighthouse $\frac{1}{4}$ mile on the port hand. After passing the lighthouse red nun buoys Nos. 2 and 4 should be left on the starboard hand on this course. From red buoy No. 4 steer about **ENE.**, heading for a black and white perpendicularly striped can buoy. Leave this buoy close-to on either hand and steer about **E. $\frac{1}{2}$ S.** for 1 mile. The vessel should then be in the dredged channel and the depth should be 9 to 10 feet; then steer about **ENE. $\frac{3}{4}$ E.** for $7\frac{1}{2}$ miles, leaving the stakes marked with boards on the starboard hand and the stakes marked with bushes on the port hand. Two beacons should be left on the starboard hand and the remains of another on the port hand. When the beacon at the eastern end of the dredged channel, which should be left on the port hand, is abeam, steer **NE.** by **E.** for $1\frac{1}{2}$ miles and then steer **NNE. $\frac{1}{4}$ E.** for the entrance to the river. When fair between the shores at the entrance, follow the directions in section 3.

Remarks and dangers.—While to the southward of the lighthouse care should be taken to avoid a 5-foot spot which lies $\frac{1}{2}$ mile **SSE. $\frac{1}{4}$ E.** from the lighthouse. The courses and buoys should be followed closely as there are several lumps on both sides of the channel. The stakes and beacons are close to the edge of the dredged channel and should be given a berth of about 80 feet. After passing through the dredged channel, the natural channel is nearly $\frac{3}{4}$ mile wide until up to the entrance of the river; the shoals on the south side of this natural channel rise abruptly, and during freshets, or with a strong ebb current, vessels should be careful not to be set on them. There is good anchorage anywhere in the channel between the dredged channel and the entrance to the river.

The **NNE. $\frac{1}{4}$ E.** course should lead fair into the entrance of the river, and a small wooded hummock should be on the starboard bow while standing on this course.

3. From the Entrance of Atchafalaya River to Morgan City.—When in mid-river and abreast of the small wooded hummock on the eastern shore of the entrance, follow a mid-river course for about 7 miles, keeping out of the bights making in on both shores. The vessel should now be at the southern entrance to Sweet Bay Lake, and a **N. by W. $\frac{3}{4}$ W.** course should lead in the channel until the river which empties into the lake opens out, when a **NW. $\frac{1}{2}$ N.** course will lead straight up the next reach of the river. Above Sweet Bay Lake follow a mid-river course except where the river broadens out and is known as Bateman Lake; here, the western shore should be followed, giving it a berth of about 225 yards. After entering the river above Bateman Lake a mid-river course should be followed until up to Morgan City.

Remarks.—The river channel is deep and the current is usually strong but it generally sets in the direction of the channel. All the bights are shallow and should be avoided. Sweet Bay Lake is the name given to a part of the river where it widens to $1\frac{1}{2}$ miles; one large and two small bayous empty into the lake from the eastward and northeastward. Abreast Morgan City the depths range from 36 to 100 feet and the bottom is sticky mud; vessels usually make fast to the wharf.

COAST FROM ATCHAFALAYA BAY TO GALVESTON ENTRANCE.*

From Southwest Reef Lighthouse to Sabine Pass Lighthouse, a distance of 123 miles in a straight line, the general trend of the coast is about **E.** and **W.**; between these points there are no important harbors, and vessels of over 6 feet draft are rarely seen standing close inshore along this stretch of coast. Lying offshore, at distances ranging from 15 to 28 miles, are a number of shoals which are dangerous to deep draft vessels at all times, and to light draft vessels in a heavy sea. Lying from 11 to $22\frac{1}{2}$ miles to the southwestward of Southwest Reef Lighthouse are two large shoals with least depths of 13 and 15 feet, respectively, over them; these shoals are about 10 miles long in a general **WSW. $\frac{1}{4}$ W.** and **ENE. $\frac{1}{4}$ E.** direction, and the offshore edge of the outer shoal is about 7 miles inside the 10-fathom curve.

*Shown on charts 190, 200, 201, 202, 203, 204, scale $\frac{1}{50,000}$, price of each \$0.50.

Trinity Shoal.—The middle of this shoal lies 37 miles SW. by W. $\frac{1}{4}$ W. from Southwest Reef Lighthouse and 20 miles S. by E. $\frac{1}{4}$ E. from Tigre Point; it is about 17 $\frac{1}{2}$ miles long in a general WSW. and ENE. direction, and its southwestern edge is about 5 miles inside of the 10-fathom curve. The depths over this shoal range from 11 to 17 feet. Between Trinity Shoal and Tiger Shoal, which lies to the northward, there is a channel with a least depth of 17 feet.

Between the western end of Trinity Shoal and the eastern end of Sabine Bank, a distance of 51 miles, the coast is clear of shoals and the water shoals gradually and regularly toward the shore.

Sabine Bank is 38 miles long in a general W. by S. and E. by N. direction, about 3 $\frac{1}{2}$ miles wide at its widest part, and lies from 13 to 23 miles from the shore. The depth over the bank ranges from 16 to 30 feet, and it is dangerous for deep draft vessels when there is any sea on; in a heavy sea it is marked by breakers. Inshore of this bank, and about 9 miles from the shore, a depth of 6 fathoms can be carried. To the southward of this bank, and about 6 miles inshore of the 10-fathom curve, the soundings are somewhat irregular and several spots with 5 $\frac{1}{2}$ fathoms of water over them are found surrounded by depths of 7 $\frac{1}{2}$ to 9 $\frac{1}{2}$ fathoms.

Lying 34 miles ESE. $\frac{1}{4}$ E. from Bolivar Point Lighthouse, directly in the track of vessels approaching Galveston from the southeastward, is a shoal nearly 4 miles long in a NE. and SW. direction with 4 $\frac{1}{2}$ to 5 fathoms of water over it. The middle of this shoal is in Latitude 29° 08' 15" N., Longitude 94° 10' 45" W., and about 16 miles SSW. from the western end of Sabine Bank; 9 $\frac{1}{2}$ to 10 fathoms of water will be found as close as 1 $\frac{1}{2}$ to 2 miles to the southeastward of this shoal, and in a heavy sea it should be avoided by vessels of moderate draft which could pass over it in smooth water.

High Islands is about 23 $\frac{1}{2}$ miles to the eastward of Galveston Entrance; it is a broad hill about 40 feet high and, being so much higher than any other land along the coast, forms a landmark which can readily be distinguished at a distance of 6 to 8 miles when standing along the coast in this vicinity.

COTE BLANCHE AND VERMILION BAYS*

lie just to the westward of Atchafalaya Bay and are formed by an irregular indentation in the coast, with Marsh Island lying to the southward and separating them from the Gulf of Mexico. These bays are shallow and of little commercial importance and are seldom entered by strangers; a draft of 5 feet can, under favorable conditions, be taken from Atchafalaya Bay through Cote Blanche and Vermilion bays, but it requires local knowledge to avoid the numerous shoals and oyster reefs which lie in and between the bays.

East Cote Blanche Bay is the name given to the part lying directly east of Marsh Island and just to the westward of Atchafalaya Bay; it is full of shoals and reefs and has no settlements on its shores.

Vessels passing from Atchafalaya Bay into East Cote Blanche Bay generally use Morrison's Cutoff, which lies between Point Chevreuil on the east and Rabbit Island on the west.

West Cote Blanche Bay lies to the northward of the eastern half of Marsh Island; its eastern and western ends are full of shoals, but there is a large area of the bay in which there is a depth of 7 feet. Cote Blanche is a plantation on the north shore of the bay; it is the highest land in this vicinity and on the bay side presents a reddish yellow, steep bluff about 70 feet high. There is a landing at Cote Blanche at which the occasional steamboat from Morgan City lands to deliver freight or passengers.

Sailing directions for Cote Blanche bays that would be of use to a stranger can not be given. There are no aids, and local knowledge is necessary for entering and navigating the bays.

Vermilion Bay lies north of the western end of Marsh Island and west of West Cote Blanche Bay; it is entered from the gulf through Southwest Pass, which leads between the western end of Marsh Island and the mainland and has a narrow and very deep channel; however, the shoals which make off from Marsh Island and the mainland have depths of only 8 feet and this is the deepest draft that can be taken into Southwest Pass. The greater part of Vermilion Bay has depths of 7 to 9 feet, but a draft of 3 to 5 feet is all that can be taken to any of the landings or into the tributaries of the bay. The principal tributary of the bay is Vermilion River which empties into its western end from the northward. A draft of 3 to 5 feet can be taken up the river to Abbeville, a town of about 2,000 inhabitants. Petite Anse Bayou empties into the bay from the northward and is the approach to the salt mines at Averys Island; a draft of about 4 feet can be taken to Averys Island, but the salt is now shipped by rail. Grand Cote is the only post office near the shore of the bay; it is situated at the northeast end of the bay and can be reached by vessels of 4 feet draft.

The shores of these bays and Marsh Island are low and marshy, with one exception, and that is Cote Blanche plantation; there are no natural marks that can be used by a stranger, and anyone bound into the bays should first obtain a pilot at Morgan City. A draft of 5 feet can be taken from Atchafalaya River through the Cote Blanche bays into Vermilion Bay but it requires local knowledge and high water.

*Shown on charts 122, 200, scale $\frac{1}{80,000}$, price of each \$0.50.

DIRECTIONS TO SOUTHWEST PASS AT ENTRANCE TO VERMILION BAY.

These directions are good for a draft of 6 feet, which is the deepest draft that can be safely taken into the bay.

1. Approaching from the Eastward.—Passing to the northward of Ship Shoal, bring Ship Shoal Lighthouse to bear **S.**, distant about 2 miles, and steer **NW. by W.** $\frac{1}{4}$ **W.** for $48\frac{1}{2}$ miles; Shell Keys buoy (can, red, No. 2) should then be close aboard on the starboard hand. From this buoy steer **NW. $\frac{1}{4}$ W. Westerly** for 15 miles; the eastern point at the entrance to the pass will then bear **NNE.** and be distant $1\frac{3}{4}$ miles. Anchor here in 8 to 11 feet of water.

Remarks.—When standing on the **NW. by W. $\frac{1}{4}$ W.** course and approaching Shell Keys buoy, the water should not be shoaled to less than 15 feet until the buoy has been sighted. On a clear day the dry part of Shell Keys, about $3\frac{1}{4}$ miles to the northward from the buoy, may be seen from aloft.

On the **NW. $\frac{1}{4}$ W. Westerly** course, the lead should be used frequently, and when standing on the last 5 miles of this course the depth at mean low water will be 7 feet. In case of low water a vessel can lie anywhere in the soft mud and wait for a rising tide. The eastern point at the entrance is low and grassy with a sandy beach.

Dangers.—Shell Keys, which are dry in places, lie off South Point, the southernmost point of Marsh Island; the southern end of the irregularly shaped shoal which surrounds these keys lies 5 miles from the shore of Marsh Island; Shell Keys buoy lies $1\frac{1}{4}$ miles to the southward of the southern end of this shoal.

Shoals with a depth of less than 6 feet over them extend from 1 to 3 miles from the south shore of Marsh Island, to the westward of Shell Keys. There are also several lumps with 5 and 6 feet of water over them lying directly off the entrance to Southwest Pass; the outer of these lumps lies $2\frac{1}{2}$ miles **SSW.** from the eastern point at the entrance. Chart No. 200 should be examined before approaching the entrance to Southwest Pass.

1 A. Approaching from the Westward.—Standing to the eastward along the coast, follow the beach, giving it a berth of about $1\frac{3}{4}$ miles until the eastern point at the entrance to Southwest Pass bears **NNE.**; then anchor in 8 to 11 feet of water.

Remarks.—To the eastward of Mermentau and until up to Tigre Point the shore is low and marshy; near Tigre Point are several ridges of a little higher land on which there is a growth of bushes and trees. Standing by Tigre Point and to the eastward of it, the lead should be used; the bottom is generally soft and if the water is low a vessel can lie in the mud and wait for higher water. The western point at the entrance to Southwest Pass is low and marshy. (See, also, the remarks and dangers under section 1.)

MERMENTAU RIVER*

empties into the Gulf of Mexico from the northeastward about 86 miles to the westward of Atchafalaya Bay entrance and 90 miles to the eastward of Bolivar Point Lighthouse. The river and its principal tributary (Nexpique Bayou) are navigable for small steamers of 4 feet draft for a distance of about 76 miles. The entrance is obstructed by a shifting bar through which there is a channel with a depth of 5 feet at mean low water. Only small schooners and barges, with a greatest draft of $5\frac{1}{4}$ feet, engaged in the local coasting trade, enter the river from the gulf. There are no aids except a buoy on the 12-foot curve outside the bar, and strangers should not attempt to enter.

Grand Chenier is a small post village about 7 miles above the mouth of the river, and any vessel able to cross the bar can be taken to the village. The depth alongside the wharves at the village is about 12 feet.

There are no regular pilots for the bar.

Sailing directions for entering the Mermentau River can not be given.

CALCASIEU PASS†

is the outlet of Calcasieu river and lake into the Gulf of Mexico, and is marked on its western side by Calcasieu Lighthouse (see table, page 16). The pass is about 98 miles to the westward of Atchafalaya Bay entrance and about 78 miles to the eastward of Galveston Entrance; it is obstructed by a shifting bar, which is being improved by the United States Government; a jetty about 7,000 feet long has been constructed from the eastern shore of the pass across the bar in a southerly direction. The depth in the channel over the bar is about

* Shown on chart 201, scale $\frac{1}{80,000}$, price \$0.50.

† Shown on charts 202, scale $\frac{1}{80,000}$, price \$0.50; 518, scale $\frac{1}{20,000}$, price \$0.20.

CALCASIEU PASS.

6 feet at mean low water. Inside the entrance, the pass, for a distance of $5\frac{1}{2}$ miles, has an average width of about 200 yards with depths ranging from 11 to 30 feet, and is an excellent anchorage for any vessel that can cross the bar. The vessels entering from the gulf are usually small schooners in the lumber trade with a draft of $5\frac{1}{2}$ to 8 feet when loaded.

Cameron is a post village on the eastern shore of the pass about $2\frac{1}{2}$ miles above its entrance; the village is of no importance; its mail is brought down the Calcasieu River from Lake Charles, about 50 miles distant.

Calcasieu Lake empties into the pass from the northward about 6 miles above the lighthouse; the lake is 13 miles long in a N. and S. direction and has an average depth of about 8 feet, but there are shoals in several places; attempts are being made to maintain a channel depth of 7 feet by dredging through these shoals.

Calcasieu River empties into the northern end of Calcasieu Lake. On the eastern bank of the river, where it widens into a small lake and about 50 miles above the entrance to the pass, is Lake Charles, the most important town on the river. The town has railroad communication with the interior and ships considerable lumber by rail and in small schooners. The deepest draft of the vessels loading here is about $6\frac{1}{2}$ feet, which is about as deep a draft as can be taken through Calcasieu Lake. Above the town the river navigation is confined to light draft steamers and towboats, the latter being engaged in towing logs to the sawmills at Lake Charles.

A stranger desiring to enter Calcasieu Pass should employ a pilot, as the channel across the bar can not yet be depended on for depth or position. Pilots will come out to a vessel making signal near the Bar buoy.

GENERAL DIRECTIONS TO THE ENTRANCE OF CALCASIEU PASS.

These directions are good for vessels of 8 feet or less draft. Vessels of over 5 feet draft can not enter the pass except with smooth water, a high tide, and the assistance of a pilot.

Approaching the entrance either from the eastward or westward, follow the trend of the shore, giving it a berth of about 2 miles. When Calcasieu Lighthouse bears about **N. $\frac{1}{2}$ W.**, stand in for the entrance buoy and wait for a pilot; if a pilot does not come out send a boat up to Cameron for one.

Remarks.—With an offshore wind and smooth sea, vessels of 7 feet draft can follow the shore to the eastward and westward of the pass at a distance of 1 mile. There are no natural landmarks; private parties maintain ranges for entering the pass, but these can not be described so as to assist a stranger in entering.

SABINE PASS.*

Sabine Pass is the outlet into the Gulf of Mexico of Sabine Lake and its two important tributaries, the Sabine and Neches rivers. It forms part of the boundary between Louisiana and Texas, and lies about 52 miles to the eastward of Galveston Entrance; in 1896 it had the deepest water in the dredged channel over the bar of any harbor on the coast of Texas. The entrance is marked on its eastern side by Sabine Pass Lighthouse (see table, page 16), and the bar has been improved by the United States Government; two jetties have been constructed which extend from either side of the entrance nearly 3 miles across the bar and into the gulf. A dredged channel between the jetties has a width of 100 feet and a depth of 24 feet. From its entrance the pass extends in a general northwesterly direction about 6 miles to Sabine Lake and has a least width of over $\frac{1}{2}$ mile, but there are numerous shoals which contract the navigable channel, in one place to a width of about 250 feet; however, a least depth of 18 feet can be taken the whole length of the pass to Sabine Lake. The pass affords excellent anchorage and is used as a harbor of refuge by small coasting vessels during the winter months.

Sabine Pass is a small town on the west shore of the pass about 4 miles above the entrance; it has railroad communication with Beaumont, to the northward, and ships some lumber to Mexican and West Indian ports. The deepest draft that has been taken to or from Sabine Pass is $17\frac{1}{2}$ feet. There is $16\frac{1}{2}$ feet of water alongside the wharves.

Sabine Lake is about 12 miles long in a general NE. by N. and SW. by S. direction and has an average depth of about 6 feet. At the southern end, where it empties into Sabine Pass, there is a bar with a depth of 4 feet. The lake is of no importance except as an approach to Sabine Pass from the two rivers which empty into its northern end; there are no villages or landings on its shores.

Sabine River empties into the northeastern end of Sabine Lake, and, for a length of two degrees of latitude, forms the boundary between the states of Louisiana and Texas. Lumber and cotton are shipped on the river, which is navigable during 3 months of the year for a distance of about 200 miles to East Hamilton, the lumber being shipped to Sabine Pass and the cotton to Orange. The latter town, the largest on the river, is situated about 27 miles above its mouth and on the line of the Texas and New Orleans railroad. The deepest draft of

* Shown on chart 262, scale $\frac{1}{80,000}$, price \$0.50; 519, scale $\frac{1}{20,000}$, price \$0.15.

the steamers running on the river is $4\frac{1}{2}$ feet, which is about as deep a draft as can be taken to Sabine Pass under favorable conditions. The river is crossed by a railroad drawbridge about 7 miles above Orange.

Neches River empties into the northwestern end of Sabine Lake; it is navigable for steamers of 3 feet draft for about 3 months in the year to **Bevilport**, a distance of about 135 miles. **Beaumont**, the largest town on the river, is situated about 27 miles above the mouth and has railroad communication; it ships lumber and cotton by rail and considerable lumber is shipped also to Sabine Pass in vessels of $4\frac{1}{2}$ feet or less draft. The river is crossed at Beaumont and Bushy Bluff by railroad bridges, which have draws of 30 and 40 feet respectively.

Prominent features.—Sabine Pass Lighthouse is the most conspicuous feature by which the pass may be recognized. The land along this stretch of coast is low, and during the freshet season much of it is covered with water. The jetties at the entrance show out of water for nearly their whole length, and on the eastern jetty, near its outer end, is a concrete beacon with iron frame on top.

Channel.—In 1896 the dredged channel between the jetties was 100 feet wide and 24 feet deep, through a mud bottom on which vessels can touch without injury; it is marked by a bell buoy at the entrance and by a whistling buoy just outside. Above the lighthouse the channel leads along the west shore of the pass and is very narrow abreast the life-saving station, but the most dangerous shoals are marked by buoys.

Anchorage.—There are two good anchorages in the pass, one to the southward of the lighthouse in 18 to 27 feet of water, and the other abreast of the northern end of the town in about 36 feet. These anchorages, however, will permit only small vessels to swing clear of the shoals; vessels 200 feet long and drawing 15 feet would have to anchor with a short scope of chain. Vessels provided with good ground tackle can, if they do not desire to enter the pass, ride out any gale by anchoring to the westward of the jetties, as close to the beach as their draft permits; the bottom for a distance of about 6 miles is soft mud or ooze. Small coasting vessels often anchor close in to the beach where the soft ooze of the bottom, stirred by the action of the water, prevents the seas from breaking; in some places alongshore the sea, in southerly gales, has the appearance of being covered with oil.

Quarantine.—The quarantine boarding station is on the west shore of the pass above the lighthouse. (See Appendix I and National Quarantines, Appendix IV.)

Pilots.—There are licensed pilots for the pass who will come out to a vessel making signal. Pilots for Sabine Lake and Sabine and Neches rivers, as far as Orange or Beaumont, can be had at Sabine Pass. (See pilot laws and rates, Appendix I.)

Towboats will come outside the bar to vessels approaching the entrance. All sailing vessels bound into the pass above the lighthouse, especially strangers, should take a towboat on account of the narrow channel and strong tidal currents.

Supplies.—Bituminous coal for steamers, in limited quantities, can be had alongside the wharves at Sabine Pass. Water can be obtained from water boat or alongside the wharves. Provisions can be had in the town.

Repairs.—The nearest places for extensive repairs to hulls of vessels or machinery of steamers are Galveston and New Orleans.

Tides and currents.—The tides and currents are irregular and depend greatly on the direction and force of the wind. During freshets in the Sabine and Neches rivers there is a strong flow out of the pass and occasionally the low land around Sabine Lake and the pass is covered with water. There is usually a strong ebb or flood current setting through the pass between its entrance and Sabine Lake. (See table, page 21, and remarks on page 23.)

SAILING DIRECTIONS, SABINE PASS.

The directions in sections 1 and 1 A are good for vessels of any draft that can enter. The directions in section 2 are good in the daytime for vessels of 9 feet draft; vessels of deeper draft should take a pilot, and no stranger should attempt to enter at night.

1. Approaching from the Eastward or Southeastward.—The coast for a distance of 60 miles to the eastward of Sabine Pass can be approached as close as 5 miles with $4\frac{1}{2}$ to 6 fathoms of water. Care should be taken to avoid Sabine Bank, which is 38 miles long in a general **E.** by **N.** and **W.** by **S.** direction and is from 13 to 23 miles offshore (for a full description of this bank see page 94). Deep draft vessels should keep in at least 10 fathoms of water until between longitudes $92^{\circ} 30' \text{ W.}$ and $93^{\circ} 15' \text{ W.}$; they can then stand to the northward, gradually shoaling the water to 5 fathoms; the shore should then be sighted and the vessel steered to the westward, keeping in about 5 fathoms of water. When Calcasieu Lighthouse is made bring it to bear **N.**, distant 6 miles, and steer **WSW. $\frac{1}{2}$ W.** for 24 miles; this

SABINE PASS—SAILING DIRECTIONS.

should lead to a position 1 mile outside the whistling buoy off Sabine Pass, and Sabine Pass Lighthouse should bear **NNW.**, distant $5\frac{1}{2}$ miles.

Light draft vessels can follow the coast, giving it a berth of about 2 miles, or keeping in 3 fathoms of water, until the whistling buoy off the entrance is sighted; then stand for the buoy and follow the directions in section 2.

Remarks.—Deep draft vessels should avoid Trinity Shoal and also the extensive shoals off the entrance to Atchafalaya, Cote Blanche, and Vermilion bays; by keeping in a depth of about 10 fathoms these shoals will be given a good berth. The eastern end of Sabine Bank is in Longitude $93^{\circ} 20' W.$ and deep draft vessels should avoid it. The lead should be used regularly when approaching the coast; the water should shoal gradually and regularly. There are no marked natural features by which to recognize the land; Calcasieu Lighthouse is the first aid and should be made by vessels approaching from the eastward or southeastward.

1 A. Approaching from the Westward or Southwestward.—From the whistling buoy off Galveston Entrance steer **NE.** by **E.** $\frac{1}{2}$ **E.** for 48 miles. The vessel should then be about 1 mile outside the whistling buoy off the entrance to Sabine Pass.

Deep draft vessels coming from the southwestward should make the land at Galveston Entrance, or, stand in for the coast between longitudes $94^{\circ} 15' W.$ and $94^{\circ} 30' W.$ This will avoid a small $4\frac{1}{2}$ -fathom shoal lying about 27 miles from the coast and 34 miles **ESE.** $\frac{1}{2}$ **E.** from Bolivar Point Lighthouse. As soon as the land is made, stand to the eastward in about 5 fathoms of water until Sabine Pass Lighthouse bears **NNW.**, distant $5\frac{1}{2}$ miles.

Light draft vessels, when to the eastward of Bolivar Point Lighthouse, can follow the shore, giving it a berth of 1 to 2 miles, until the whistling buoy off the entrance to Sabine Pass is made; then stand for the buoy and follow the directions in section 2.

Remarks.—High Islands, about $23\frac{1}{2}$ miles to the eastward of Bolivar Point Lighthouse, is a knoll about 1 mile in diameter and about 40 feet high; this is the highest land on the coast to the eastward of Galveston, and it is quite a landmark for vessels making, or standing along, the coast. There is a good anchorage in 3 to 6 fathoms of water for a distance of 15 miles to the westward of the entrance to Sabine Pass where vessels, if supplied with good ground tackle, can ride out a severe gale.

2. Entering, and to an anchorage.—From the whistling buoy off the entrance, steer **NNW.** $\frac{1}{2}$ **W.** for Sabine Pass Lighthouse. Leave the red bell buoy on the starboard hand and steer so as to pass about midway between the jetties, which will partly show above water, and continue in the middle of the pass until abreast the lighthouse; here, anchor in 4 to 5 fathoms water.

Or, if bound up to the town and, in case of a sailing vessel, the wind is favorable, continue past the lighthouse; leave red nun buoy No. 2 on the starboard hand and haul in gradually for the western shore so that just before reaching the quarantine station the vessel should be 80 yards from the shore. Follow the western shore at a distance of 80 yards, leaving red nun buoy No. 4 on the starboard hand, and, when a little over $\frac{1}{4}$ mile above this buoy, anchor in 5 to 6 fathoms of water, about 150 yards from the water front of the town.

Remarks.—At low water the jetties, except their unfinished outer ends, can be seen; at high water the greater part of the eastern jetty will be seen. The dredged channel leads fair between the jetties, and a depth of 9 to 11 feet will be found on both sides of it. The channel above red nun buoy No. 2 is very narrow and the reef on its eastern side is principally oyster shells; a vessel striking this reef is liable to have trouble in getting off, as the currents will tend to set her on harder. Sailing vessels are advised to take a pilot or tow-boat from abreast the lighthouse to the town.

GALVESTON BAY*

is a large, irregularly shaped, shallow bay in the coast of Texas about 300 miles, in a straight line, to the westward of the South Pass of the Mississippi River; it is the approach by water to the city of Houston and a number of towns situated on its tributaries. The southern part of the bay and its entrance form what is commonly known as Galveston Harbor; this, the most important port in the State of Texas, is treated under a separate heading in this volume. The bay is about 30 miles long in a general **NNE.** and **SSW.** direction, about

* Shown on chart 204, scale $\frac{1}{80,000}$, price \$0.50.

17 miles wide at its widest part, and has a general depth of 7 to 11 feet. There are a number of small post villages on the shores of the bay, the most important of which are: **Texas City**, on the west shore about 1 mile to the southward of Shoal Point; **North Galveston**, on the west shore at Edwards Point; **Laporte**, on the west shore near Morgan Point; and **Anahuac**, on the eastern shore opposite the mouth of Trinity River. None of these are of commercial importance. **Redfish Bar** crosses the middle of the bay in a general **ENE.** and **WSW.** direction; a dredged channel, marked by beacons and stakes, permits vessels of 8 feet draft to pass from the southern to the northern part of the bay.

Improvements are in progress to obtain a channel 12 feet deep and 100 feet wide through Galveston Bay into the San Jacinto River and up Buffalo Bayou to the city of Houston, but at present (1896) the deepest draft of the vessels navigating the bay is from 5 to 8 feet.

East Bay is a large, shallow bay making to the eastward about 16 miles from the southern end of Galveston Bay and lying to the northward of **Bolivar Peninsula**. The depths in this bay range from 3 to 8 feet, and there is a reef known as **Hanna Reef** extending nearly the whole distance across its western end.

West Bay is a long, shallow body of water extending from the southwestern part of Galveston Bay for 19 miles, in a general **SW.** direction, between Galveston Island and the mainland. Near its eastern end it is crossed by railroad drawbridges; improvements have been made, under the United States Engineers, by dredging channels about $3\frac{1}{2}$ feet deep through the two principal shoals; these channels are marked by beacons. Only small boats and steamers of about 3 feet draft pass through the bay, which forms part of the inside passage to Brazos River. At its western end, West Bay is entered from the gulf through **San Luis Pass** which has a depth of about 7 feet on the bar. This pass is not safe for a stranger.

TRINITY RIVER

empties into the northeastern end of Galveston Bay; this is one of the largest rivers in the State of Texas and drains one of the richest sections of the state. The river is navigable at certain seasons of the year for a distance of about 120 miles by light draft steamers. The three principal towns which have any trade by water, and their approximate distances from the mouth of the river, are: **Wallisville**, 5 miles; **Moss Bluff**, 17 miles; **Liberty**, 35 miles. The trade from these places is in cotton, cattle, lumber, and wood, carried in vessels of 5 feet or less draft. The entrance of the river has been improved by the construction of two jetties which extend into the bay from each side of one of the mouths of the river known as **Middle Pass**. Between these jetties a channel 100 feet wide and 5 feet deep has been dredged across the bar which obstructs the entrance. Pilots for Galveston Bay and Trinity River can be found at Galveston; a stranger should not attempt to enter the river without one.

CEDAR BAYOU

empties into the northwestern end of Galveston Bay from the northeastward, about $1\frac{1}{2}$ miles below the mouth of the San Jacinto River. The entrance of the bayou is obstructed by shoals which form a bar with a depth of 2 feet; this bar has been improved by the construction of two jetties which extend from the entrance of the bayou into the bay; between these jetties a dredged channel 90 feet wide and 5 feet deep leads into the bayou, which has a general depth of 7 feet in the channel.

SAN JACINTO RIVER

empties into the northwestern end of Galveston Bay from the northwestward. The entrance of the river is obstructed by shoals over which the least depths are 2 to 3 feet; the river, however, is now entered through what is known as the **Morgan Cut and Canal**; this consists of a dredged cut in the northwestern part of Galveston Bay, about $4\frac{1}{2}$ miles long, extending in a **NNW. & W.** direction toward **Morgan Point**, the western point at the entrance to San Jacinto River, and a canal nearly $\frac{1}{2}$ mile long which has been cut through Morgan Point and which connects with the deep water inside the mouth of the river. The cut and canal (1896) have a least depth of $7\frac{1}{2}$ feet and a width of 100 feet; the former is marked by a large day beacon at its southern end and row of piles on its western side from the beacon to the canal. From the canal to Lynchburg, a distance of about 6 miles, the San Jacinto has a least channel depth of about 12 feet.

Buffalo Bayou is a narrow tidal stream which empties into San Jacinto River from the westward at **Lynchburg**; it is important as the approach by water to the city of **Houston**, to which place a draft of 6 feet can now be taken. Improvements are in progress to maintain a navigable channel for the commerce of the city of Houston, which is mostly carried in barges of 5 feet draft and towboats of less than 7 feet draft; large shipments of cotton are made from Houston to Galveston. The city of Houston is about 21 miles above **Lynchburg**; at and below the city the bayou is crossed by 5 bridges which have draws ranging from 60 to 110 feet in width. Strangers should not attempt to enter the San Jacinto River or Buffalo Bayou. Pilots for these waters can be obtained on application to the Houston Direct Navigation Company, at Galveston.

GALVESTON BAY—INFORMATION.

GENERAL INFORMATION.

Anchorage.—The bottom, in a depth of 6 to 10 feet, is generally soft and good holding ground, so that vessels can anchor almost anywhere in this depth of water. During a norther, however, the water is blown out of the bay and vessels of 5 feet draft will lie on the bottom where at ordinary stages there is a depth of 8 feet.

Pilots and towboats.—Pilots and towboats for Galveston Bay and its tributaries can be had at Galveston, and it is advisable for strangers to employ either one or the other.

Supplies.—Provisions and ship chandler's stores can be had at Lynchburg and Houston (see, also, Galveston Harbor).

Repairs.—There is a small marine railway at Lynchburg, but Galveston is the nearest place where extensive repairs can be made.

Tides and currents.—The tides are irregular and depend mostly on the force and direction of the winds. A northerly wind makes low water, and a southerly wind high water, in the bay. The currents also depend on the winds; they are strongest in the entrance of the bay and across Redfish Bar. (See table, page 21, and remarks, page 23.)

GALVESTON HARBOR*

is the name generally applied to the southern part of Galveston Bay bordering on the city of Galveston; the entrance to the bay and harbor from the Gulf of Mexico, between Bolivar Peninsula on the northeastward and Galveston Island on the southwestward, is known as Galveston Entrance. Galveston is the principal port in the State of Texas and one of the most important on the Gulf Coast of the United States. The entrance, in Latitude 29° 21' N. and Longitude 94° 45' W., is obstructed by a bar which extends nearly 4 miles into the gulf; this bar has been improved by the construction of jetties and dredging, so that in 1896 a depth of 22 feet could be taken in over it; this depth, however, is not permanent. The harbor may be properly divided into an outer and inner harbor; the former includes the deep water between the inner parts of the jetties and between Bolivar and Fort points; the latter is a narrow, deep slue, about 200 yards wide, which leads from the outer harbor (Galveston Entrance) along the north shore of Galveston Island and northern front of the city of Galveston for a distance of about 3½ miles. Both harbors afford good anchorage and during the winter months furnish refuge for coasting vessels; the inner harbor, however, is too narrow for long vessels to swing without striking either the wharves or the bank on its western and northern side; this bank has an average depth of 3 feet and prevents a heavy sea in the harbor during northers.

The city of Galveston, situated near the eastern end of Galveston Island, has a large foreign trade in cotton and cotton-seed products, and a coastwise trade in cotton and coal. Several lines of coasting steamers make regular trips to ports on the Atlantic and Gulf coasts. Galveston is also a railroad terminus for several lines running through the interior of the state and does a large wholesale business in supplies for the adjacent country.

Prominent features and aids.—Approaching the entrance from seaward, Bolivar Point Lighthouse (see table, page 16) will show conspicuously on the northern point at the entrance. On the southern side of the entrance, Fort Point Lighthouse and the large buildings in the city of Galveston show prominently, the tall grain elevator being often sighted before Bolivar Point Lighthouse. The ends of the jetties are not marked, but between the jetties, inside the bar, is Galveston Light-vessel. A whistling buoy is in place outside the bar from October to May inclusive, and the channel is well marked by buoys which are shifted to indicate the best water.

Channels.—The channel over the bar, leading about midway between the jetties, has been obtained by dredging; in 1896 it had a depth of 22 feet, but the depth and width of this channel are liable to change. Inside the bar, the channel is over ¼ mile wide with a depth greater than 22 feet, and extends to Fort Point, where it branches, the main part leading in a NW. direction between shoals into Galveston Bay, the other, a narrow, deep slue, running along the north shore of Galveston Island and northern front of the city of Galveston. The channel into Galveston Bay is known as Bolivar Channel.

Anchorage.—The best anchorage for large vessels is in Bolivar Channel between Bolivar and Fort points; the depths here range from 3½ to 8 fathoms and the bottom is good holding ground. The anchorage off the wharves of the city is too narrow for long vessels to swing at anchor, and, besides, they would interfere with incoming and outgoing vessels. The harbor master of Galveston has control of the anchorage and berthing of vessels within the corporate limits of the city (see harbor regulations for the port of Galveston, Appendix I). Vessels outside the bar and prevented from entering by a norther can anchor in about 5 fathoms of water with Bolivar Point Lighthouse bearing about NW.; the holding ground is good and there will be but little sea.

* Shown on charts 204, 205, scale $\frac{1}{80,000}$, price of each \$0.50; 520, scale $\frac{1}{40,000}$, price \$0.15.

Quarantine.—Every vessel arriving at the port is subject to inspection by the local quarantine officer. The quarantine station is on the west side of the channel inside of Fort Point, but no vessel will be permitted to pass inside of the black buoy off Fort Point until boarded, inspected, and given pratique; vessels will be boarded and inspected anywhere between the light-vessel and the black buoy off Fort Point between sunrise and sunset, exception only being made for vessels in distress. (See quarantine, Appendix I, and National Quarantines, Appendix IV.)

Pilots will be found cruising outside the bar, or, will come out to a vessel making the signal. A vessel desiring a pilot, and not having been boarded outside, should stand off and on outside the jetties, keeping in at least 5 fathoms of water, until a pilot is obtained. Pilotage is compulsory (see pilot laws and rates, Appendix I).

Towboats.—Sailing vessels are advised to take a towboat, especially in the channel from Fort Point to the wharves. Towboats will come to vessels outside the bar, or they may be had at the city for towing over the bar or in the bay.

Lines inside of which the "**Rules of the Road**" for harbors, rivers, and inland waters, etc., are to be followed:— "From Galveston Bar whistling buoy **N.** by **W. $\frac{3}{4}$ W.** through the beacon marking the outer extremity of the north jetty, and **SW.** by **W. $\frac{1}{2}$ W.** Westerly, through North Breaker Beacon."

Wharves.—The depth of water alongside the wharves ranges from 20 to 30 feet, according to location. The facilities for loading and discharging cargoes are very good. The harbor master has control of the berthing and moving of vessels and the removal of cargo from the wharves. (See, also, harbor regulations, Appendix I.)

Supplies.—Coal for steamers, either anthracite or bituminous, can be had at the wharves or from lighters in the stream. Fresh water can be had alongside the wharves or from water boats in the stream. Provisions and ship chandler's stores can be obtained in the city.

Repairs.—There is one marine railway with cradle 190 feet long, 40 feet wide, and a capacity of about 1,000 tons. The facilities for repairs to hulls of vessels are fair, and a number of machine shops in the city have facilities for ordinary repairs to the machinery of steamers.

Wind Signals of the United States Weather Bureau are displayed on the Cotton Exchange in the city and are visible to the shipping at anchor in the harbor.

Marine Hospital Service.—Medical attendance is furnished by a medical officer of the service. Seamen requiring long-continued hospital treatment are sent to the Marine Hospital at New Orleans, La.; for short terms of hospital treatment they are sent to one of the hospitals in the city.

Tides and currents.—The tides are irregular, depending almost entirely upon the force and direction of the winds (see table, page 21, and remarks, page 23). The tidal currents, when not influenced by winds, are weak, but strong currents are caused by northerly and southerly winds; the former lower the water in the entire bay and its tributaries and cause a strong current out over the bar; the latter raise the level of the water in the bay and cause a strong set in over the bar.

Winds.—The prevailing winds are northerly from November to February and southerly the remaining months; northers are frequent from December to March. These gales, although occasionally blowing with a velocity of over 40 miles, are not dangerous to vessels anywhere close to the coast, as they blow directly off-shore and the sea is not heavy; the Weather Bureau warning of their approach gives vessels ample time for preparation. (See remarks on northers, page 24.)

SAILING DIRECTIONS, GALVESTON HARBOR.

The directions up to the entrance over the bar are good for vessels of any draft. The directions for entering are good in the daytime with smooth water for vessels up to 15 feet draft. Vessels of over 15 feet draft should take a pilot outside the bar; when there is a heavy sea or swell all strangers should take a pilot before crossing the bar. At night a stranger of over 12 feet draft should not attempt to enter without a pilot.

1. **Approaching from the Eastward.**—Deep draft vessels should not approach the coast in less than 13 fathoms of water until to the westward of Longitude $94^{\circ} 15'$ W. Then stand to the northwestward, using the lead and not approaching the shore closer than in 5 fathoms of water until a landfall is made. As soon as Bolivar Point Lighthouse is made, bring it to bear **WNW. $\frac{1}{2}$ W.** and stand in on this bearing until it is $5\frac{1}{2}$ miles distant; then take a pilot.

GALVESTON HARBOR—SAILING DIRECTIONS.

Coasting vessels which have made the land to the eastward of Galveston Entrance and are running alongshore, should haul offshore before Bolivar Point Lighthouse bears **W.** by **S.**, so as to avoid the shoals which extend out from the entrance for a distance of $3\frac{1}{2}$ miles. If drawing 15 feet or less, follow the directions in section 2.

Remarks and dangers.—Sabine Bank, which is described on page 94, should be avoided by all deep-draft vessels. The small shoal with $4\frac{1}{2}$ fathoms of water over it, which lies 84 miles **ESE.** $\frac{1}{2}$ **E.** from Bolivar Point Lighthouse and 27 miles from the coast, is avoided by standing in for the shore to the westward of Longitude $94^{\circ} 15' W.$ When approaching the entrance the large elevator, with water tank on top, will be a conspicuous landmark and in hazy weather will probably be seen before Bolivar Point Lighthouse; the latter is the principal aid at night. A stranger approaching the coast at night and not being sure of his position should not shoal his water to less than 7 fathoms; in this depth daylight should be waited for. Care must be taken to avoid the wreck of the "Waco" which lies 6 miles **ESE.** $\frac{1}{2}$ **E.** from Bolivar Point Lighthouse and is marked by a red and black horizontally striped buoy.

1 A. *Approaching from the Southward or Southwestward.*—Deep draft vessels making the land to the westward of Galveston Entrance should follow the coast, giving it a berth of 4 miles to insure a depth of 6 fathoms. A **NE.** course made good from Brazos River buoy will lead parallel to the coast and off the entrance to Galveston Harbor.

Light draft vessels can follow the coast at a distance of about 2 miles until nearly abreast the city of Galveston; then haul offshore and pass well to the eastward of North Breaker beacon, the South Jetty, and the buoys at the entrance to Galveston Harbor.

Remarks and dangers.—There is a small shoal with a least depth of 5 fathoms over it lying 5 miles from the beach and $8\frac{1}{2}$ miles from Fort Point Lighthouse; extending for a distance of $3\frac{1}{2}$ miles in an **ESE.** direction from this spot are several spots with $5\frac{1}{2}$ to $6\frac{1}{2}$ fathoms over them; the shoaler of these spots might be dangerous for deep draft vessels in a heavy sea. Galveston Island is low and, to the westward of the city of Galveston, bare of trees. The large elevator near the eastern end of the city is a conspicuous mark, and can be recognized from a distance of 10 miles in clear weather. Vessels waiting to be boarded by a pilot can anchor outside the bar in 6 fathoms of water. (See, also, remarks and dangers under section 1.)

2. *Entering and to the Wharves at Galveston.*—When in 6 fathoms of water bring Bolivar Point Lighthouse to bear **WNW.** $\frac{1}{2}$ **W.** and steer for it on this bearing until Outer Channel buoy (red, No. 2) is picked up. As the bar is approached red nun buoys Nos. 2 and 4 should be made on the starboard bow; leave these buoys on the starboard hand and steer for the light-vessel; on this heading leave four black buoys in succession on the port hand and when up to the light-vessel leave the latter close-to on either hand; then steer about **W.** for Mid-channel buoy (black and white perpendicular stripes). Passing close to this buoy, steer about **WSW.**, keeping a large black can buoy, No. 5, on the port bow; leave this buoy 200 yards on the port hand and when Fort Point Lighthouse bears **SSE.**, distant a little over $\frac{1}{4}$ mile, haul to the southward, course about **SSW.**, and head for the white building (Quarantine Lazaretto) which is on the western side of the channel. Leave the Quarantine Lazaretto about 100 yards on the starboard hand and steer about **S.** $\frac{1}{2}$ **W.**; leave the red beacon 225 yards on the starboard hand and haul a little more to the westward, so as to leave black buoy No. 7 on the port, and red buoy No. 8 on the starboard, hand. From the latter buoy follow the line of the wharves and keep about 100 yards from them. Anchor in the channel, or make fast, as directed by the harbor master.

Remarks.—The channel over the bar is liable to shift, but the buoys will be moved to indicate the best water. Vessels should be guided by the buoys rather than the given courses. Black buoys are placed to mark the southern edge of the channel between the jetties; these buoys should be left on the port hand. Two red buoys are placed to mark the eastern point of Pelican Spit; these must be left on the starboard hand when standing into the channel which runs along the north side of Galveston Island. The Quarantine Lazaretto is built on piles on the western edge of the channel; above the lazaretto, and on the same side of the channel, are a red beacon and a red buoy. The bank on the western side of the channel rises abruptly and has only 1 to 5 feet of water over it. (See harbor regulations, Appendix I.)

SAN LUIS PASS*

is 27 miles southwestward from the jetties at Galveston Entrance and affords an entrance from the gulf to the western end of West Bay. The pass leads past the western end of Galveston Island and has a least width of $\frac{1}{2}$

* Shown on chart 205, scale $\frac{1}{80,000}$, price \$0.50.

mile, but it is obstructed by a shifting bar which extends about 1 mile into the gulf and which usually has a channel depth of 7 to 8 feet. The channel over the bar is not marked, and a stranger should not attempt to enter the pass. Making to the westward from San Luis Pass is a narrow channel which communicates with a shallow body of water called **Oyster Bay**; the latter is the approach to the canal, controlled by the Columbia Transportation Company, which leads into the Brazos River. Steamers of 3 feet draft can pass from Galveston to the Brazos River without going outside, but navigation of the inland waters requires local knowledge; toll is collected from vessels passing through the canal.

Sailing directions for the pass or Oyster Bay, that would be of use to a stranger, can not be given.

BRAZOS RIVER *

empties into the Gulf of Mexico about 36½ miles to the southwestward of Galveston Entrance. It is one of the largest rivers in the State of Texas and during high stages of water has been ascended by light draft steamboats to the town of **Washington**, a distance of about 218 miles. At ordinary stages of water in the river, it is navigable for steamers of 3 feet draft to **Bolivar Landing**, 42 miles above its mouth. Cotton and cotton-seed products are shipped from the Brazos River, mostly in foreign steamers and sailing vessels which can load to a draft of 19 to 20 feet. The entrance, which is marked by Brazos River Lighthouse, is obstructed by a bar; it has been improved by the **Brazos River Channel and Dock Co.**, which has constructed jetties at the entrance of the river; between these jetties the channel depth is 16½ feet at mean low water; the company also claims control of the river for a distance of 12 miles above the jetties, but no charges for toll are made.

The width of the river below the town of Velasco is 500 to 600 feet; this part of the river is a good anchorage and harbor of refuge for small vessels, but there is not room for large vessels to swing at anchor. The **Brazos and Galveston Canal** enters the river about ½ mile from its mouth.

Quintana is a small town on the western shore just inside the entrance to the river. It is proposed to construct a railroad terminal and docks on the east shore of the river opposite Quintana. Vessels can go in and out of the river, to and from Quintana, drawing 18 feet and without the assistance of a towboat.

Velasco is a town on the north bank of the river, 5 miles above its mouth; the town is a railroad terminus and has good facilities for loading and discharging vessels. The depth of water at the wharves is 15 feet and the deepest draft taken to the town is 16½ feet at high water.

Brazoria is 25 miles above the mouth of the river; there is a depth of 12 feet at the wharves but the deepest draft that can be taken to Brazoria at high water is 9 feet.

Columbia, 32 miles, and **Bolivar Landing**, 42 miles, above the mouth of the river, ship cotton, cotton-seed products, and lumber in light draft steamers to Velasco and Galveston.

Prominent features and aids.—**Brazos River Lighthouse** (see table, page 18) is on the north bank of the river about 1 mile inside the entrance and on a line with the axis of the south jetty. The dome of **Hotel Velasco**, in the town of Velasco and about 5 miles above the mouth of the river, is a conspicuous mark; a small electric light is shown on the dome at night. There is a beacon on the south jetty about 2,500 feet from its seaward end. Several buoys are placed to indicate the channel to the entrance between the jetties.

Quarantine.—See Appendix I and National Quarantines, Appendix IV.

Pilots will come out to vessels making signal off the bar. (See pilot laws, Appendix I.)

Towboats.—All sailing vessels of 12 feet draft are advised to take a towboat unless with a strong fair wind; no sailing vessel of over 12 feet draft should attempt to go above Quintana without a towboat. Towboats can be had outside the bar, by signal, or at Quintana.

Supplies.—By giving due notice, coal for steamers can be had at Velasco. Fresh water and provisions can also be obtained at Velasco.

Repairs.—The nearest place where repairs to vessels and machinery of steamers can be made is Galveston.

Wind Signals of the United States Weather Bureau are displayed at Velasco.

Tides.—For tides see table on page 21 and general remarks on the tides in the Gulf of Mexico on page 23.

SAILING DIRECTIONS, BRAZOS RIVER.

The directions for entering are good in the daytime, with clear weather and smooth sea, for vessels of 12 feet or less draft. Vessels of deeper draft should employ a pilot.

1. Approaching the Entrance.—The shore to the northeastward and southwestward of the entrance to Brazos River can be approached as close as 1½ miles carrying a depth of 20 feet or more. As the entrance is approached care should be taken not to shoal

* Shown on charts 206, scale $\frac{1}{80,000}$, price \$0.50; 525, scale $\frac{1}{10,000}$, price \$0.25.

BRAZOS RIVER—SAILING DIRECTIONS.

the water to less than 20 feet. Bring Brazos River Lighthouse to bear **NW. $\frac{3}{4}$ W.** when still in 22 feet of water and then follow the directions in section 2.

Remarks.—The whistling buoy (or a perpendicularly striped can buoy in summer) is a little over $1\frac{1}{2}$ miles outside of the jetties in about 5 fathoms of water. A red buoy and a black buoy will be seen off the ends of the jetties; these buoys mark the entrance.

2. Entering and to an Anchorage.—With Brazos River Lighthouse bearing **NW. $\frac{3}{4}$ W.** stand for it, taking care not to be set to the westward. Leave the black buoy about 250 yards on the port hand and the red buoy about 100 yards on the starboard hand and then stand fair in between the jetties, course **NW. $\frac{5}{8}$ W.** Continue up the river, keeping in mid-stream; anchor to the southward of the lighthouse in about 25 feet of water.

Remarks.—The beacon on the south jetty should be kept open to the left of the lighthouse when standing for the entrance and when between the jetties. A number of wing dams have been built out from the banks of the river to protect them from scour. In the bend, where the river changes its direction to the southwestward, the channel slightly favors the southern shore. A stranger should take a pilot to pass up the river above the lighthouse.

PASS CAVALLO AND MATAGORDA BAY.*

Pass Cavallo is about 103 miles to the southwestward of Galveston Entrance; it is one of the approaches from the gulf to the long chain of bays and lagoons which stretch along and just inside of the coast of Texas for a distance of about 210 miles, from near the Rio Grande to Latitude $28^{\circ} 46'$ N. The entrance of the pass, between Matagorda Peninsula on the east and Matagorda Island on the west, is about $1\frac{1}{2}$ miles wide, but the shifting nature of the shoals which obstruct the entrance renders likely a change of width during any heavy gale or hurricane. On the western side of the entrance is Matagorda Lighthouse (see table, page 18), the most prominent mark by which this locality may be recognized.

The bar which obstructs the entrance of the pass shifts frequently and the channel depth over it varies from $8\frac{1}{2}$ to 11 feet; in 1896 there was a depth of $9\frac{1}{2}$ feet and the channel favored the western side of the entrance. The buoys marking this channel are shifted, when practicable, to indicate the best water, but no stranger should attempt to enter without the assistance of a pilot. In northerly winds or in a smooth sea vessels can anchor in 6 to 7 fathoms of water with the lighthouse bearing between **WNW.** and **NW.** and wait for a pilot; when there is a heavy sea vessels can not cross the bar. The deepest draft of vessels entering under favorable conditions is 9 feet, but few vessels of over 5 to 6 feet enter, as this is the deepest draft that can be taken to either of the towns on Matagorda Bay. The anchorage near the head of the pass, in 19 to 21 feet of water, is good, and it is sometimes used by small coasting schooners which seek shelter from southerly or easterly gales.

Matagorda Bay, the principal body of water entered through Pass Cavallo, is very irregular in shape and depth; it is about 45 miles long in a general northeasterly and southwesterly direction, its width ranging from 1 mile at its eastern end to 10 miles at its western end, and its depths from 3 to $13\frac{1}{2}$ feet. For its whole length it is separated from the gulf by only a narrow strip of beach called Matagorda Peninsula, which is, properly speaking, an island, as there is a narrow passage through it with a depth of 4 feet and several cuts with about 1 foot of water, which were scoured out in the hurricane of 1875.

Colorado River, which empties into Matagorda Bay near the town of Matagorda, can not be entered from the bay, as there is only about 1 foot of water on the bar.

A number of shallow bays are tributary to Matagorda Bay, but with the exception of Lavaca Bay, which makes to the northwestward from the western end of Matagorda Bay and is the approach to the town of Port Lavaca, they are of no importance and are entered only by local fishermen and oystermen.

Port Lavaca, a town on the western shore of Lavaca Bay and about 23 miles above the entrance to Pass Cavallo, has some trade in lumber and general merchandise carried in small schooners of about 5 feet draft. It is the only town in this vicinity which has railroad communication with the interior of the state.

Matagorda is a small town on the northern shore of Matagorda Bay and about 32 miles to the northeastward of the entrance to Pass Cavallo. A draft of 3 feet can be taken to the town and 6 feet can be taken to an anchorage 5 miles from the town.

At present there is no commissioned pilot for Pass Cavallo, but the keeper of the life-saving station will bring vessels over the bar; the old rate for pilotage was \$4 per foot each way. Local fishermen can be found to pilot vessels in Matagorda Bay and its tributaries. There are no towboats; the buoys marking the

* Shown on charts 207, 208, scale $\frac{1}{80,000}$, price of each \$0.50; 222, scale $\frac{1}{30,000}$, price \$0.15.

channel over the bar are the only aids that can be used by a stranger and these can not always be depended on to indicate the best water.

Wind Signals of the United States Weather Bureau are displayed at Port Lavaca. (See, also, pages 21 to 25 for general information regarding winds, tides, etc.)

The quarantine station is on Matagorda Peninsula, about 2 miles from Decros Point. Vessels subject to visitation by the quarantine officer are boarded in the channel off Decros Point. (See quarantine, Appendix I, and National Quarantines, Appendix IV.)

GENERAL DIRECTIONS TO THE ENTRANCE TO PASS CAVALLO.

These directions are good for vessels of any draft, but only vessels of about 8 feet draft can enter with smooth water and the assistance of a pilot.

1. *Approaching from the Eastward.*—From the buoy off the entrance to Brazos River, a **SW. $\frac{1}{2}$ W.** course made good for 68 miles should lead to the buoy off the entrance to Pass Cavallo.

Remarks.—On the **SW. $\frac{1}{2}$ W.** course the beach should nowhere be approached closer than 2 miles and the depth should not be less than 5 fathoms. There are no natural landmarks that can be recognized by a stranger; Matagorda Lighthouse will show conspicuously, and the life-saving station to the northeastward of the lighthouse will be plainly seen from outside the bar. There will usually be some current setting in the direction of the wind and care should be taken not to be set too close to the beach.

1 A. *Approaching from the Southwestward.*—From the Outer Bar buoy at Aransas Pass, a **NE. $\frac{1}{4}$ N.** course made good for 45 miles should lead to the buoy off the entrance to Pass Cavallo.

Remarks.—The beach for a distance of 5 miles to the westward of Pass Cavallo should be given a berth of at least $1\frac{1}{4}$ miles. (See the remarks under section 1, preceding.)

SAN ANTONIO BAY *

is a large, irregularly shaped, shallow body of water nearly midway between Pass Cavallo and Aransas Pass; it is entered from Pass Cavallo through *Espiritu Santo Bay*, and from Aransas Pass through Aransas and Mezquit bays, but by neither of these routes can a draft of more than 3 feet be taken into the bay, and it requires local knowledge to carry this draft. These waters are used by small flat-bottomed schooners and sloops which carry lumber, cordwood, and cotton, the latter for shipment by rail to Port Lavaca or Rockport. *Long Mott*, a post village at the northeastern end of the bay and the principal settlement on its shores, can be reached by vessels of 3 feet draft.

Pilots for *Espiritu Santo* and *San Antonio* bays can be had from among the fishermen and flatboatmen in Matagorda or Aransas bays.

ARANSAS PASS †

is the principal approach from the gulf to Aransas and Corpus Christi bays and their numerous tributaries; it lies 45 miles **SW.** from Pass Cavallo and about 150 miles **SW.** from Galveston Bay entrance, in Latitude $27^{\circ} 50'$ N. and Longitude $97^{\circ} 08'$ W. *Aransas Pass Lighthouse* (see table, page 18), inside the entrance on *Harbor Island*, is the most easily recognized mark in the vicinity of the pass. The entrance is obstructed by a shifting bar which extends nearly 1 mile into the gulf and has a channel depth of about 7 feet; this channel and its extension into Aransas Bay is marked by a number of buoys which are shifted, when practicable, to indicate the best water, but a stranger should not attempt to enter the pass without a pilot; when there is a heavy sea running the bar is impassable for any kind of vessel.

The deepest draft of the vessels entering the pass is about 7 feet and this draft can be taken to Rockport and Corpus Christi, the two most important towns, each of which has railroad communication with the interior of the state.

Aransas Bay empties into Aransas Pass from the northward; it is about 15 miles long in a general **NNE.** and **SSW.** direction, and in the middle and near its southern end has depths ranging from 8 to $12\frac{1}{4}$ feet; near its northern end, where it joins *Mexquit Bay*, it is very shallow; only vessels of 3 feet draft can pass into and

* Shown on chart 202, scale $\frac{1}{80,000}$ price \$0.50.

† Shown on chart 209 and in part on chart 210, scale $\frac{1}{80,000}$ price of each \$0.50.

ARANSAS PASS—DESCRIPTION.

through Mezquit Bay and thence into San Antonio Bay. **Ropesville** is a post village on the south side of the entrance to the pass, on the north end of **Mustang Island**. **Rockport**, a small town on the west shore of **Aransas Bay**, has railroad communication with the interior of the state; a depth of 10 feet is found close to the town.

Copano Bay joins **Aransas Bay** at its northwestern end; this bay is full of shoals between which are several narrow slues or channels with a depth of about 7 feet. The town of **St. Mary**, on the north shore of **Copano Bay** near its western end, can be reached by vessels of about 6 feet draft; following the channel, the town is about 33 miles from **Aransas Pass Lighthouse**.

Corpus Christi Bay is entered from the southern end of **Aransas Bay** through a narrow channel between two islands; this channel at its northern end is known as **Corpus Christi Bayou**, and at its southern end, where it has been improved by dredging, as "**Morris and Cummings Cut**." The bayou and cut have a combined length of about 5 miles and a depth of about 7 feet, but are narrow and crooked, necessitating a leading wind for sailing vessels to pass through. The bay is 14 miles long in an **E.** and **W.** direction and has a greatest width of about 10 miles; its general depth ranges from 8 to 15½ feet and there are few shoals to obstruct its free navigation. **Corpus Christi** is situated on the west shore of the bay. Although the terminus of a railroad from the interior, it has little commerce.

Portland and **Ingleside** are two small post villages on the north shore of the bay. Entering **Corpus Christi Bay** from the southward, and extending along and just inside a narrow strip of beach known as **Padre Island** for a distance of nearly 100 miles, is a narrow, shallow lagoon called **Laguna Madre**; this lagoon has only a few inches of water in some places and, so far as known, is not navigable through its whole length, even for boats, except during high stages of water.

Pilots for **Aransas Pass** will come out to a vessel making signal off the bar. The rate for pilotage is \$4 per foot each way. (See pilot laws, Appendix I.)

The quarantine station is on the northern end of **Harbor Island**. During the season when quarantine is in force vessels are boarded by the quarantine officer.

GENERAL DIRECTIONS, ENTRANCE TO ARANSAS PASS.

The following directions will lead to the Outer Bar buoy. No stranger should attempt to enter without a pilot.

Vessels standing along the coast to the southward of **Pass Cavallo**, and approaching **Aransas Pass** either from the southward or from the northward, can follow the beach, giving it a berth of about 1 mile. As the entrance to **Aransas Pass** is approached the lighthouse will be seen and the life-saving station and houses in the village of **Ropesville**, at the south side of the entrance, will be recognized. The Outer Bar buoy should be made about 1½ miles from the shore; farther inshore, marking the end of a submerged jetty, is a red nun buoy marked "**J.**" In ordinary weather there is good anchorage just outside the Outer Bar buoy in about 7 fathoms of water.

BRAZOS SANTIAGO*

is 236 miles **SSW.** ¼ **W.** from **Galveston Entrance** and 106 miles **S.** ½ **E.** from **Aransas Pass**; it is a narrow pass (less than ¼ mile wide) between **Padre Island** on the north and **Brazos Island** on the south, and is the approach to **Laguna Madre** from the southward and to the town of **Isabel**, the latter being 2½ miles from the entrance. **Brazos Santiago Lighthouse** (see table, page 18), just inside of the north point at the entrance, and **Point Isabel Lighthouse**, 2½ miles **W.** ¼ **N.** from the former, are the principal guides to the entrance. The shifting bar at **Brazos Santiago** extends a little over ¼ mile into the gulf and has a changing depth ranging from 6 to 9 feet in the channel over it. In 1895 the depth was about 7½ feet. Usually the bar is impassable for all vessels from August to December, and during the rest of the year it is only when there is no sea or swell that vessels of 6 to 7 feet draft can enter. The **Morgan steamers**, which make regular trips to **Brazos Santiago**, usually lighter their freight, outside the bar, into a shallow stern-wheel steamer which lands at **Isabel**.

The depth of water inside the bar and to an anchorage between **Padre** and **Brazos** islands is 10 to 25 feet, but only 5½ feet can be taken to a point near **Isabel**, and there is a depth of 3 feet alongside the wharf at that town. **Isabel** has railroad communication with the interior; a supply of coal for the **Morgan steamers** is kept here; provisions and fresh water (in casks) can be obtained.

Pilots.—All vessels entering **Brazos Santiago** should take a pilot, who, if the sea on the bar permits, will come out to any vessel making signal. In case the pilot can not come out, and he thinks it practicable for the

* Shown on chart 212, scale $\frac{1}{80,000}$, price \$0.50.

vessel to cross the bar, he will set up ranges on shore for the vessel to steer on while entering. Pilotage is compulsory for foreign vessels (see pilot laws, Appendix I). The rate for pilotage is \$4 per foot each way.

All vessels entering are obliged to stop at the anchorage, in 10 feet of water, abreast the quarantine station on Padre Island, until boarded by the quarantine physician.

Northers are frequent during the winter months; they are dangerous for vessels outside, but the anchorage inside is secure in gales from any direction. (See, also, remarks on winds, page 24.)

GENERAL DIRECTIONS TO THE ENTRANCE OF BRAZOS SANTIAGO.

These directions are good up to the Outer Sea buoy. No stranger should attempt to enter without a pilot.

Vessels standing along the coast should give the beach a berth of 1 mile. As Brazos Santiago entrance is approached the lighthouse on the north side (see table, page 18), and the life-saving station and a few houses on the south side, of the entrance will assist a stranger to recognize the locality. In ordinary weather, but when there is too much swell to cross the bar, vessels can anchor to the southeastward of the Outer Sea buoy in 5 to 6 fathoms of water, soft bottom.

RIO GRANDE.*

The mouth of the Rio Grande is $6\frac{1}{2}$ miles to the southward of Brazos Santiago; it is obstructed by a shifting bar over which the depth in the channel varies from 3 to 5 feet; inside the bar the river has a least navigable depth of about 4 feet to the city of Brownsville, a distance of about 50 miles, but the channel is narrow and tortuous. An occasional pleasure boat is the only craft entering the river from the gulf, but a steamer runs regularly between **Brownsville** and **Rio Grande City** farther up the river.

Strangers entering the river should take a pilot. When the bar is passable a customhouse boatman, from the Mexican side of the river, will come out to vessels and pilot them in.

Sailing directions which would be of use to a stranger can not be given.

* Shown on chart 212, scale $\frac{1}{80,000}$, price \$0.50.

APPENDIX I.

PILOTS AND PILOTAGE, HARBOR CONTROL, QUARANTINE, ETC.

FLORIDA.

PILOTS AND PILOTAGE.

Extracts from the Revised Statutes of Florida, 1892.

945. Penalty for acting as pilot without license.—Any person who shall act as pilot for any of the ports in this State without a license from said board of commissioners, shall be guilty of a misdemeanor, and shall be fined one hundred dollars for each offense.

946. Per diem to pilots in quarantine.—In all cases where a pilot shall be detained in quarantine by reason of having boarded any vessel in the discharge of his duty as such pilot, the said vessel or owners shall be required to pay to such pilot \$4 per day during the time of his necessary detention in quarantine.

947. Pilot bringing vessel in entitled to take her out.—Any licensed pilot who shall take or bring a steamer or vessel into port shall be entitled to take her out, * * *

948. Rates of pilotage.—The board of pilot commissioners of each port may fix the rates of pilotage which shall be paid by any vessel entering their port; but in no case shall they fix the rates greater than the rates now provided by law, as follows: All steamers or vessels entering any port or leaving the same shall be subject to pay to any licensed pilot performing duty on board, or to the pilot who shall first speak to such steamer or vessel, the following rates of pilotage: For steamers or vessels drawing 6 feet or less than the same, \$2 per foot; for steamers or vessels drawing from 6 to 10 feet, \$3 per foot; for steamers or vessels drawing from 10 to 14 feet, \$4 per foot; for steamers or vessels drawing from 14 to 20 feet, \$5 per foot; for steamers or vessels drawing over 20 feet, \$6 per foot. These rates shall apply to all steamers or vessels, whether owned wholly by citizens of this State or not: *Provided*, That all steamers or vessels carrying the regular United States mails shall pay half pilotage only: *Provided further*, That all steamers or vessels drawing less than 6 feet of water, and having a coastwise license, shall be exempt from paying whole or half pilotage, unless they employ a pilot.

HARBOR MASTERS IN GENERAL.

956. Duties and fees.—It shall be the duty of said harbor masters to board either in person or by deputy, every vessel coming into their respective ports, and to demand of the master of every vessel arriving from sea, the permit of the port physician, † and to deliver the same to the president of the board of health of said port; it shall be the duty of every master of any vessel arriving at the ports in this State to report to the harbor master for a station or for a berth at the wharves, and the harbor master shall regulate and station or assign berths at the wharves to said vessel; and it shall be their duty to remove or cause to be removed, from time to time, all vessels not employed in receiving and discharging their cargoes, to make room for such others as require to be more immediately accommodated, for the purpose of receiving or discharging their cargoes, and to facilitate their dispatch. It shall be the duty of said harbor masters to be present at all times either in person or by deputy, to facilitate by stationing or assigning berths at the wharves to vessels arriving at the ports, and to facilitate them in the discharging and receiving their cargoes and to prevent confusion and delay. And the said harbor masters shall have full and absolute power to determine how far and in what instance it is the duty of masters and others having charge of vessels to accommodate each other in their respective situations, and if any master or wharf owner or lessee of a wharf or wharves, or other person, shall oppose or resist the harbor master or his deputy or deputies in the execution of his or their

† See National Quarantine.

duties, he shall be deemed guilty of a misdemeanor and shall be fined in a sum not exceeding fifty dollars for each offense, or imprisoned not exceeding thirty days, one or both, at the discretion of the court trying the same. Harbor masters, respectively, shall receive a compensation for the duties required of them by this article from the owners, masters or consignees, or either of them, of every vessel arriving at the port to receive or discharge cargoes, the following fees, viz: For any vessel drawing ten feet or less the sum of five dollars, and for any vessel drawing more than ten feet, the sum of one dollar for every additional foot of draft.

2746. Obstructing harbor master in certain ports.—If any person shall oppose or resist a harbor master * * * or his deputy, in the execution of his duties, or shall disobey any order given by either of them as to the manner of removing or adjusting the rigging of any vessel under the control of such person, he shall be punished by imprisonment not exceeding one year, or by fine not exceeding five hundred dollars.

QUARANTINE.

2680. Disobeying quarantine regulations.—Whoever violates, disobeys, omits, neglects, or refuses to comply with any quarantine regulations which may be established by the State health officer, or any of the rules and regulations which may be duly promulgated by said State health officer or said State board of health, shall be punished by imprisonment not exceeding six months, or by fine not exceeding one thousand dollars. †

See, also, National Quarantines in Appendix IV.

Extracts from the Rules and Regulations of the State Board of Health of Florida, 1893, as amended May 7, 1894.

Directions to Masters.—Vessels subject to quarantine restrictions destined to ports on the west coast of the State, between Key West and Cedar Keys, including both of these ports, will report at the Mullet Key Quarantine Station, Tampa Bay, or to the United States Quarantine Station, Dry Tortugas, Florida; for points beyond and west of Cedar Keys to the Escambia County Quarantine Station on Santa Rosa Island, or the United States Quarantine Station on Ship Island; for ports on the east coast to the United States Quarantine Station on Blackbeard Island, Sapelo Sound.

Sec. 28. All vessels arriving at any of the ports of the State of Florida between the 1st of May and the 15th of November, inclusive, of each year, must lie-to or anchor at a point to be designated in each harbor as the inspecting point, and marked by a buoy with a yellow flag thereon, and there remain until inspected by the sanitary inspector of the port, acting under authority of the State board of health.

Sec. 29. Vessels of the following classes arriving at any of the ports, harbors, or inlets of the State of Florida between the 15th day of November and the 1st day of May, shall be subject to inspection as specified in sections 25 and 26:

(a) Any vessel with sickness on board at arrival or upon which sickness shall appear while in ports;

(b) All vessels from foreign ports;

(c) Vessels from foreign ports having entered a port of the United States without complete discharge of passengers and cargo;

(d) Vessels from ports suspected of infection with yellow fever, having entered a port of the United States north of the southern boundary of Maryland without disinfection, shall be subjected to disinfection before entering any port of the State of Florida during the quarantine season.

Sec. 30. The inspection of vessels required by these regulations shall be made as far as possible between sunrise and sunset, except in case of vessels in distress.

Sec. 34. For the purpose of these regulations the quarantineable diseases are cholera (cholerae), yellow fever, smallpox, typhus fever, and leprosy; and "suspicious ports" or places suspected of being infected are all ports in the West Indies, on the east coast of America between 23° 30' north and 32° south latitude, and from west coast of Africa between 23° 30' north and 10° south, except such as are known and declared by the Supervising Surgeon-General of the Marine-Hospital Service to be free from infection.

Sec. 35. Vessels under the following classifications arriving at any of the ports of the State of Florida between May 1st and November 15th, inclusive, of each year, shall be directed by the State sanitary inspector to the nearest State or United States Quarantine or Refuge Station to undergo quarantine and disinfection:

(a) All vessels directly or indirectly from foreign or domestic ports where yellow fever may prevail; and

†Same penalty for disobeying the quarantine rules of county boards of health.

- (b) All vessels arriving from foreign or domestic ports where cholera, smallpox, leprosy or other contagious or infectious diseases may prevail at any season of the year; and
 (c) All vessels in port at any season of the year upon which yellow fever, cholera, smallpox, leprosy, or other contagious or infectious diseases may be developed after arrival; and
 (d) All vessels in an unsanitary condition when inspected, or upon which there shall be sickness of an infectious or contagious nature; and
 (e) All vessels without the required bill of health.

FEES ADOPTED MAY 7, 1894.

To be charged at all the ports in the State of Florida.

INSPECTION.

Steamships and ships	\$15. 00
Tugs, brigs, barks, barkentines, and three and four masted schooners.....	10. 00
Two-masted schooners and other vessels.....	5. 00
All vessels making regular trips from noninfected domestic ports, except two-masted schooners and sloops.....	7. 50
Two-masted schooners and sloops.....	5. 00

DISINFECTION BY STEAM STERILIZATION, SULPHUR FUMIGATION, AND MERCURIC WASHING.

Steamships and ships	75. 00
Barks and four-masted schooners.....	60. 00
Tugs, brigs, and two and three masted schooners.....	50. 00
Smacks and all other vessels	40. 00

DISINFECTION BY POT SULPHUR FUMIGATION AND MERCURIC WASHING.

Steamships and ships	60. 00
Barks and four-masted schooners.....	45. 00
Brigs and two and three masted schooners	40. 00
Smacks and all other vessels	35. 00
Tugboats	25. 00
Discharge of ballast 25 cents per ton.	

See, also, National Quarantines, Appendix IV.

CHARLOTTE HARBOR AND PUNTA GORDA.

Extracts from the rules and regulations for the government of Pilots, April 1, 1891.

Sec. 1. The master of any vessel entering the bay of Charlotte Harbor through Boca Grande Pass, who does not require the services of a pilot, shall be compelled to pay half the legal rate of pilotage, providing the vessel be spoken outside of Bar Buoy, or on leaving the master who does not require a pilot, shall be compelled to pay one-half the legal rate of pilotage, providing he be spoken twenty-four hours previous to his time of sailing.

Sec. 2. Any pilot who shall bring a vessel into this port shall be entitled to carry her out, unless the master of said vessel can show good and sufficient reason to the contrary.

Sec. 3. Any pilot detained on board of any vessel by the master, or quarantine officer, shall receive for each and every day's service the sum of three dollars per day over and above his pilotage.

Sec. 4. All fees and rates of pilotage on vessels entering or leaving this harbor shall be due forty-eight hours previous to day of sailing, * * *

Sec. 5. The rates of pilotage now established by law are as follows from Gulf to Punta Gorda:

DRAFT.	RATE PER FOOT.
6 feet	\$2. 00
6 to 10 feet.....	3. 00
10 to 14 feet	4. 00
14 to 20 feet	5. 00
Over 20 feet.....	6. 00
Rate of pilotage Boca Grande to Punta Gorda	2. 00
Rate for changing anchorage:	
14 feet draft.....	5. 00
Over 14 feet draft.....	10. 00

APPENDIX I.

Sec. 11. Pilots, speaking vessels, ordered to other ports by quarantine authorities, will be entitled to half inward pilotage for such service, same to be collected of vessel.

Sec. 12. For delivery of letters and orders directing vessels to other ports, Pilots shall be entitled to half inward pilotage for such service, same to be collected from party sending such orders.

See state laws for quarantine, page 110, also National Quarantines, Appendix IV.

APALACHICOLA.

Extracts from harbor rules and regulations.

Any vessel or lighter allowing ballast to be discharged or go overboard in bay, except at such place designated by the Board of Pilot Commissioners, the owners of such lighters shall be fined according to law.

The pilots shall also be notified that they will have to attend to West Pass, in case of any vessel calling there for a pilot, as they frequently do, and order such vessel, if she can not enter and load at West Pass, to proceed to East Pass. This must be done immediately on pilots hearing of any vessel at West Pass.

All vessels requiring a pilot in harbor, or when ready for sea, should fly his jack on the fore-topgallant mast.

It is the duty of pilots to be close to the Outer Bar at least from sunrise to sunset, then it would be impossible for vessels to come in without pilots.

Tug boats and river steamers are requested to slow down when passing wharves opposite the city of Apalachicola, either coming in or going out.

All masters and consignees of vessels will take notice, and after that from this date all masters will report to the harbor master for a berth on Ballast Grounds so as vessels will be in a proper berth before discharging any ballast. Masters of vessels will also report to harbor master for loading berth, and all vessels loading in Dog Island Cove, twenty-four hours after vessel is loaded, must move out of said cove so as to give light vessels a proper berth * * *

See the state law for Harbor Masters in general, page 109; also the state law for Pilots and Pilotage on page 109.

Extracts from the Rules and Regulations of the Board of Health.

Sec. 2. All boats and vessels arriving at the port of Apalachicola on and after May 1, 1891, upon which any contagious, infectious or pestilential diseases have occurred or existed during the voyage to said city, or within thirty days next preceding the arrival of said boat or vessel at said port or city of Apalachicola, is forbidden to approach the city, nearer than is specified in the rules and regulations of the Board of Health herein promulgated. * * *

The stations for vessels entering East Pass shall be at Pilot Cove on the west side of East Pass, at or near St. George's Island, and at a point about 2 miles east of the west end of Dog Island. No pilot shall leave any vessel at the ballast grounds coming from an infected or suspicious port under a penalty of a fine.

The station for vessels entering West Pass shall be at the buoy on Higgins Flat.

Sec. 6. The quarantine physician or inspector shall be at all times between sunrise and sunset ready to visit and board all vessels as soon as apprised of their arrival in the bay, at the points hereafter designated by a flagstaff showing a yellow flag. * * *

Sec. 9. The quarantine physician shall charge a visiting fee of \$5 in all cases where he attends patients on board vessels, and charge for all medicines, cost of boat hire, and supplies furnished to the respective vessels. Such fees and charges to be collected from master or owners of vessels to which such patients belong, * * *

Should any vessel be permitted to discharge ballast while performing quarantine, such vessel or owners shall pay the Board of Health not exceeding 75 cents per ton, * * *

Sec. 11. All vessels at quarantine station shall keep a flag at half mast at the fore during the day, and a lantern at the same position at night.

Sec. 24. * * * These rules and regulations are subordinate to but adjunct to the rules and regulations of the State Board of Health of Florida * * *

N. B.—The fees for inspection and disinfection are given in the rules and regulations of the State Board of Health on page 111.

PENSACOLA.

Note.—Extracts from the State laws, for pilots and pilotage, are given on page 109. The rates of pilotage for the port of Pensacola are given in the state laws, except that each additional half foot of draft is also charged for at one-half the rate per foot.

Extract from rules and regulations prescribed by the Board of Pilot Commissioners for the port of Pensacola.

Sec. 3. It shall be the duty of every master of vessels arriving at this port to report to the Harbor Master for a station in the stream or for a berth at the wharves, and the Harbor Master shall regulate and station or assign berths at the wharves to said vessels; and it shall be their duty to remove or cause to be removed, from time to time, all vessels not employed in receiving or discharging their cargoes to make room for such others as require to be more immediately accommodated for the purpose of receiving or discharging their cargoes, and to facilitate their dispatch. * * *

Sec. 4. The Harbor Master shall see that all vessels of any kind will leave a space of about four hundred (400) yards from the end of the wharves, for the purpose of having a road open for steamers and the towing of rafts. * * * If any vessel is an obstruction it will be moved at the expense of the captain of the said vessel. When taking out ballast at the wharves or elsewhere, tarpaulins must be used under the chute. At the wharves jib booms and spanker booms will be rigged in so as to take up as little room as possible. * * *

Sec. 5. All vessels loading at anchorage in stream must so secure their timber as to allow passage for vessels and rafts to and from the wharves.

Sec. 6. No vessel at anchor in stream or at wharf shall be allowed to use warps, hawsers, or chain to each other, or across slips, except in moving vessels.

Sec. 7. It shall not be lawful for any steamer or vessel of any description, or for any barge or lighter used in unloading such steamer or vessel, or for any person, to discharge any rock, sand, gravel, ballast, or other material, or place or cause to be placed any obstruction to navigation or commerce, in the waters of any harbor, port, bay, or river of this State, except in accordance with these regulations.

Sec. 10. Any steamer or vessel of any description of the tonnage of twenty tons and upwards, while lying at anchor in this port shall, during the night, show an anchor light.

Sec. 13. All vessels after being loaded forty-eight hours must move to the outside of the fleet.

See the state laws for Harbor Masters in general on page 109.

Extracts from the rules and regulations of the Board of Health of Escambia County, Florida.

Sec. 5. The Quarantine Station shall be on Santa Rosa Island, just west of Little Sabine Inlet. The boundaries of the quarantine ground shall be as follows:

Beginning at the point on the low tide line of the gulf shore of Santa Rosa Island three-quarters of a mile east of the eastern limit of the Little Sabine Inlet; thence across Santa Rosa Island and into Santa Rosa Sound on a line bearing north by west from the point of beginning to the middle of the channel of Santa Rosa Sound; thence westerly on the middle line of said channel to a point in said channel bearing southwest by south, one-half south from Deer Point to the north shore of Santa Rosa Island; thence on a line bearing south by east to a point on the low tide line of gulf shore of Santa Rosa Island; thence along the low tide line of said gulf shore of Santa Rosa Island to the point of beginning. The points above described as being in the water to be designated by buoys bearing yellow flags, and those on land to be designated by yellow flags fixed on substantial poles.

Sec. 7. The Quarantine Physician shall charge a visiting fee in all cases where he attends patients, either on board ship or in the quarantine hospital, and for all medicines and supplies furnished, such fees to be collected from the master of the vessel to which said patient belongs, * * *

Sec. 9. The master or other person in command of any vessel entering the bay of Pensacola between the above dates,† shall proceed with her directly to the Quarantine Station above designated.

Sec. 12. All vessels at Quarantine shall keep a flag at half-mast at the fore during the day, and a lantern in the same position at night.

Sec. 21. All tugs (except when taking vessels into Quarantine Station) and all crafts, of every character, going into, coming out of, or passing through quarantine lines, shall lay to off and as near the guard station as practicable, designated by a yellow flag, and remain there until visited by the officer in charge of the guard, and permitted by him to pass.

See the state laws for quarantine on page 110, also National Quarantines in Appendix IV.

APPENDIX I.

ALABAMA.

PILOTS AND PILOTAGE.

Extracts from laws relating to pilots and pilotage.

RATES OF PILOTAGE.

	<i>Per foot.</i>
Up to and including 9 feet draft	\$2.50
9½ feet and up to and including 10½ feet	3.00
11 feet and up to and including 12 feet	3.25
12½ feet and up to and including 14 feet	3.50
14½ feet and up to and including 20 feet	5.00
20½ feet and all over that draft	6.00

Act approved February 23, 1883.

* * * but no pilot who has piloted a vessel over the bar into the bay of Mobile, shall be compelled, without additional compensation, to pilot said vessel to the city of Mobile
 * * * If said vessel is to be or is being towed by a steam tug or towboat, in such case if the master of the vessel so in tow, or to be towed, as aforesaid, demand a pilot from the Lower Bay to the city or port of Mobile, it shall be the duty of the pilot who conducted the vessel over the outer bar to take the vessel * * * and for his services in this respect, said pilot shall receive * * * not exceeding fifty cents for each foot of the draft of said vessel.

Sec. 31 (1394). * * * A pilot who has brought a vessel into port is entitled to his fees before her departure from port, to be paid in advance, or security given for the payment, and, on failure thereof, may refuse to carry the vessel out.

Sec. 32 (1391). * * * Every pilot boat cruising or standing out to sea must offer the services of a pilot boat to the vessel nearest the bar, unless a vessel more distant is in distress, to aid her if required, or to aid a vessel in sight showing signals of distress.

Sec. 35 (1399). * * * Whenever a vessel entering into the bay or harbor of Mobile is crossing over, or is within the outer bar, before a pilot offers, he may, at his option, take or refuse a pilot. If he requires a pilot, he must indicate it by a signal, and the nearest pilot boat must furnish a pilot at half the rate of pilotage of a vessel at that draft. * * *

Act approved February 8, 1887.

Sec. 1. * * * It is the duty of every outer bar pilot to deliver to the master of any and every vessel approaching the bay or harbor of Mobile as soon as he can board such vessel, all letters that may be sent to him for that purpose, on the person who requires the delivery of such letters paying or securing to the pilot twenty dollars for such services, unless the pilot so employed to deliver letters is engaged as pilot for the vessel, in which event he is entitled to five dollars for the service. * * * before a pilot offers, he may, at his option, take or refuse a pilot. If he requires a pilot, he must indicate by a signal, and the nearest pilot boat must furnish a pilot at half the rate of pilotage of a vessel of that draft. A pilot refusing to act in such case must be deprived of his branch, and also forfeits the sum of one hundred dollars.

Sec. 3. * * * That all vessels trading between any domestic port on the Gulf of Mexico and the Port of Mobile, drawing seven feet or less of water, shall not be required to employ a pilot, but if they do, their pilotage shall be paid. * * *

QUARANTINE.

Extracts from the Act entitled "An Act to establish and provide for the maintenance of a Quarantine by improved methods, against the introduction of yellow fever and other infectious and contagious diseases in the State of Alabama."

Sec. 5. Be it further enacted that the said Board (Quarantine Board of Mobile Bay) may, from time to time, prescribe the observance of quarantine by all vessels arriving within the bay or harbor of Mobile, or the vicinity thereof, and make regulations therefor, which may be necessary or desirable to insure the preservation of the public health and not contrary to law; such regulations to extend to all persons, goods or effects arriving in such vessels, and to all persons going on board same, as well as the vessels themselves; * * *

Extracts from the Criminal Code of 1886.

4089 (4224). Refusal of information to Health Officer—Penalty.—Any master, seaman or passenger belonging to any vessel supposed to have any infection on board, or from any port where any dangerous infectious disease prevails, who refuses to answer on oath such inquiries as are made by any Health Officer relating to any infection or disease, must, on conviction, be fined not less than one hundred dollars.

4090 (4225). Breach of Quarantine—Penalty.—The master of any vessel, ordered to perform quarantine, must deliver to the officer appointed to see it performed his bill of health, and manifest, log-book and journal; and if he fail to do so, or to repair in proper time after notice, to the Quarantine ground, or departs thence without authority, he must, on conviction, be fined not less than two hundred dollars.

Extracts from the Rules and Regulations of the Quarantine Board.

The Quarantine Physician shall attend at the station and not depart thence except by permission of the Quarantine Board. He shall board all vessels entering the bay or harbor of Mobile, as soon as practicable after their arrival, *between the hours of sunrise and sunset*, and examine into the condition of vessels and cargoes and the health of all persons therein, including the examination of as many of such persons under oath as he may deem necessary.

The inspection fees for all vessels entering Lower Mobile Bay shall be as follows:

Steamships.....	\$15.00
Sailing ships.....	15.00
Barks and four-masted schooners.....	10.00
Brigs and three-masted schooners.....	7.50
Tugs and two-masted schooners.....	5.00
Other vessels.....	3.00

The fees for the disinfection of vessels shall be as follows:

Steamships.....	\$75.00
Sailing ships.....	50.00
Barks and four-masted schooners.....	40.00
Brigs and three-masted schooners.....	20.00
Two masted schooners.....	15.00
Other vessels.....	10.00

In addition to these charges there shall also be charged and collected for the treatment of the sick either in hospital or on board vessels, at the rate of one dollar (\$1.00) per day for each person so treated, and the handling of cargoes and ballast shall in all instances be done at the expense of the vessels interested.

Pilots and captains and crews of towboats are required not to board infected vessels but to speak them off the bar, and direct them to the Gulf Quarantine Station on North Channel Island.† They will furnish all other vessels, that is to say those entering Lower Mobile Bay, with a copy of these regulations. During the existence of Quarantine all pilots or other persons having charge of vessels entering Mobile Bay shall cause such vessels to heave-to, or come to anchor, at or near the Quarantine Station, and such vessels shall there remain until they shall have been boarded by the Quarantine Physician, and shall have received permission from him to proceed, and no pilots or other persons boarding such vessels will be allowed to leave the same until permission to do so shall have been given by the Quarantine Physician. It shall also be the duty of pilots or other persons bringing a vessel into the Bay of Mobile to hoist a flag at half-mast at the fore, until the vessel has been visited by the Quarantine Physician; and all vessels required to perform quarantine shall keep a flag at half-mast at the fore during the day, and a lighted lantern in the same position at night, and no person shall leave a vessel nor visit a vessel at Quarantine without a written permit to do so from the Quarantine Physician.

Extracts from Laws, Rules, and Regulations for Mobile Harbor, May 1, 1895.

Act approved February 28, 1889.

Sec. 7. Be it further enacted, That any person in charge of a vessel who resists or opposes the "harbor master" or "acting harbor master" in the lawful execution of his duties, shall be fined by the mayor of Mobile, not exceeding fifty dollars, to be collected, enforced and applied, as are fines for violation of municipal corporations.

Sec. 13. * * * That any person, in any manner by his negligence or wantonly shall damage any ship, channel, natural or artificial, in the river or bay of Mobile, or if any person shall damage any beacon, stake, piling or other thing, or channel mark used in connection with the navigation thereof, he shall be required by the harbor master to repair

†The National Quarantine Station is on Ship Island.

such damage, and on failure to do so within ten days after such notice the offender forfeits five hundred dollars to be recovered with costs in any court of competent jurisdiction. * * *

Act approved December 10, 1892.

Sec. 1. * * * That it shall be the duty of all vessels coming in the channel of Mobile Bay or Mobile River, to so anchor that the vessels shall be and remain parallel to the fairway of the stream or the channel, and for that purpose sufficient anchors shall be placed fore and aft to hold the vessel in position.

Sec. 2. * * * That any vessel so anchoring in the channel of Mobile Bay or Mobile River, which shall fail to promptly comply with the requirements of the foregoing section, shall forfeit the sum of not exceeding fifty dollars for each twelve hours or fraction thereof that said vessel shall fail so to comply. * * *

Rule 2. Vessels entering the port of Mobile, must on arrival in the river rig in their jib booms, and other outriggers, cockbill their yards, and take their anchors in on deck, when not in use. When permission is given a vessel to keep her jib boom and other outriggers out, the vessel having such permission will be held responsible for any damage done to other vessels by them.

Rule 3. When a vessel arrives up in the river, in charge of a pilot, the pilot in charge thereof must see that she is anchored clear of the main channel, and he will be held responsible for a violation of this rule. When a vessel arrives up in the river, without a pilot, and anchors in the main channel she must when so directed to do by the harbor master or acting harbor master remove immediately.

Rule 4. When a vessel is directed to move by the harbor master or acting harbor master, to make room for another vessel or to enable another vessel to enter or leave a slip or berth, she is expected to, and must comply with such direction immediately.

Rule 7. All vessels loading or discharging in the stream are required to moor at both ends with anchors sufficiently heavy to hold them straight up and down the stream.

Rule 10. Vessels will not be allowed to receive or discharge cargoes while anchored or moored in the river below One-Mile Creek without special and written permission from the President of the Mobile River Commission.

Rule 11. Masters wanting anchor berths to lay their vessels up will apply to the harbor master, who will designate a berth where a vessel can be put. * * *

Under the laws of the State the dredged channel is under the management and control of the harbor master, and a violation of any of the laws governing the channel will be vigorously prosecuted by him. It is also his duty to give to masters of vessels the maximum draught to which vessels shall draw to pass up and down the channel, and they are directed to get from him said draught before entering the channel.

MISSISSIPPI.

PILOTS AND PILOTAGE.

Extracts from Annotated Code of Mississippi, 1892.

Sec. 2259. * * * The fees allowed pilots for compulsory pilotage * * * shall not in any case exceed four dollars per foot; and all United States vessels of one hundred and fifty tons burden or less shall not be subject to compulsory pilotage.

Sec. 2263. In all cases where any pilot shall be detained in quarantine * * * the vessel and her owners shall be required to pay him three dollars per day during the time of his necessary detention in quarantine; * * * If the master of any vessel carry off a pilot from any seaport, he shall pay such pilot the sum of five dollars per day for every day the pilot is absent, and he shall further supply the pilot with provisions and accommodations as is usual for the maintenance of masters of vessels, and the master as well as the owner, shall be liable for the same; but if such vessel have laid to for the space of four hours, after crossing the bar, and a pilot boat did not appear to receive the pilot, the claim shall not be allowed.

HARBOR CONTROL.

Extract from Annotated Code of Mississippi, 1892.

Sec. 2257. * * * The harbor master shall have general supervision of the harbor and port, under the direction of the pilot commissioners, and shall be entitled to charge the following fees, payable by the ship, steamship, or sailing vessel to which service is rendered, viz: Boarding fee, five dollars; moving fee, five dollars; superintending the discharge of ballast, not exceeding three dollars and fifty cents a day for each day actually engaged.

PASCAGOULA HARBOR.

Extracts from rules and regulations for Pascagoula Harbor, adopted by the board of Pilot Commissioners of Jackson County, July 18, 1893.

Art. 2. Any pilot speaking a ship or other vessel entering the bay of Pascagoula to seaward of the sea buoy and tendering his services as pilot thereto, such ship or other vessel declining or refusing to accept the services thus tendered, shall be liable to and shall pay such pilot one-half the pilotage fees which would have been due had his services been accepted and the ship or other vessel been piloted in by him; but any vessel not spoken for inward pilotage shall not be exempt from outward pilotage.

Art. 3. The master or owner shall be liable to the pilot for services rendered in conducting a vessel in or out of the bay of Pascagoula, over which said master or owner may exercise control and authority.

Art. 4. For any service rendered by a pilot in piloting a vessel into or out of Pascagoula Harbor, of three hundred tons register or over, such pilot shall be authorized to collect four dollars per foot, actual draught of water, for such service; and for all vessels under three hundred tons register, subject to pilotage, he shall be authorized to charge and collect three dollars per foot.

Art. 5. If the master of a vessel detains a pilot on board of his vessel, the wind and weather permitting such vessel to proceed, he shall pay such pilot five dollars for every day of such detention; and all disputes between masters of vessels and pilots or harbor-master shall be decided by the port wardens.

Art. 6. Every pilot cruising or standing out to sea must offer the services of a pilot to the vessel nearest the bar, unless a vessel more distant is in distress, under a penalty of fifty dollars, for each and every neglect or refusal to approach the nearest vessel or to aid a vessel in distress, or to aid any vessel in sight and showing signals of distress, * * *

Art. 8. All fees for harbor-masters or pilots must be paid or secured to the proper parties before the vessel shall leave the port.

Art. 9. Any vessel passing a line drawn from the mouth of West Pascagoula River to the west end of Horn Island or the east point of Petit Bois Island and the boundary line of the State of Mississippi, which shall not have been spoken by a licensed pilot shall not be liable for or required to pay inward pilotage fees.

Art. 10. The pilot who brings a vessel into port has a right to take her out, and the master shall give such pilot notice of his intended departure, and when personal notice cannot be given, the master of the vessel about to depart shall hoist a "Jack" at the foremast head for twenty-four hours previous to his departure.

Art. 12. All vessels entering the bay of Pascagoula, after having been spoken by a pilot to seaward of the sea buoy (such pilot having been licensed by the Board of Pilot Commissioners of the bay of Pascagoula), shall pay the pilot so speaking her the full pilotage fees which would be due such pilot had he performed the service of piloting such vessel into the bay and harbor of Pascagoula, notwithstanding the master may have accepted and used the services of a pilot not licensed by said Board of Pilot Commissioners.

Art. 13. All vessels entering the port of Pascagoula seeking freight and going to another port to load cargo, shall pay only one pilotage.

Art. 14. It is ordered that it shall be the duty of the Harbor-master to move all vessels that are to be moved in the harbor of Pascagoula, and the pilots are not to move any vessel at anchor in the harbor of Pascagoula, except to take them to sea or in case of distress, unless requested by the harbor-master. That the harbor-master's fee shall be five dollars for each time he moves or moors a vessel, * * *

Art. 15. It shall be the duty of the master of every vessel arriving at the bay of Pascagoula in ballast to report the same immediately to the harbor-master, * * *

Art. 16. Any owner, master, or person in charge of any vessel who shall permit, allow, or cause any ballast to be discharged or thrown overboard from such vessel into the waters of the bay of Pascagoula or its tributaries shall be liable to a fine of one thousand dollars for the first offense and to a fine of two thousand dollars for the second and each subsequent like offense, * * *

Art. 17. It shall be the duty of the harbor-master to visit all vessels upon their arrival at this port and to designate their anchorage ground and berth, * * * for which he shall receive a fee of five dollars from each vessel; * * * and to render such other and further services as may be necessary in the execution of his office, * * *

Extracts from the quarantine rules and regulations for the port of Pascagoula.

Sec. 1. The quarantine station shall be situated south of Round Island, and all vessels subject to quarantine shall anchor south of said island and as near thereto as the depth of water will permit. The quarantine ground shall be bounded by a line running due south from the east end of Round Island 3 miles, thence west to a line running south from the west end of said island, thence north to the island, and the south side of the island shall be the north boundary.

Sec. 11. No boat shall approach within one half mile of any vessel coming into Pascagoula Bay until such vessel shall have been visited and discharged from quarantine by the quarantine physician, except authorized pilots, and they only for the purpose of piloting such vessel into port, and towboats under the direction of the quarantine physician.

Sec. 14. The charges for fumigation shall be the cost of material, and \$2.50 on vessels of 60 tons and under; \$5 from 60 tons to 150 tons; \$7.50 from 150 tons to 250 tons; \$10 from 250 tons to 500 tons, and \$12.50 on all over 500 tons.

Extracts from An Act supplementary to an Act entitled an Act to amend the statutes in regards to Board of Health.

Sec. 8. Be it further enacted, That all vessels in quarantine shall keep a flag at half mast during the day and a lantern in the same position at night; * * *

Sec. 10. Be it further enacted, That the quarantine physician shall be authorized to demand and receive the sum of five dollars or such other sums not to exceed that amount, as may be prescribed by the Board of Health, * * *

SHIP ISLAND HARBOR.

At a meeting of the Board of Pilot Commissioners for Ship Island Harbor, it was ordered by the Board that the following rules and regulations for the government of pilots, and protection of commerce for Ship Island Harbor, Mississippi, be and are hereby made and adopted.

Extracts.

Rule 1. That any licensed pilot who shall take or bring a steamer or vessel into port shall be entitled to take her out, and any other pilot taking out such steamer or vessel shall forfeit the full amount of pilotage to the pilot rejected, and the captain and owners thereof shall be bound to pay to the pilot rejected the fees as established by law, unless the master aforesaid shall show good cause to the contrary, which shall be satisfactory to the Board of Pilot Commissioners. That all vessels on being ready for sea are required to pay their pilotage on shore at Biloxi.

Rule 2. That all steamers or vessels entering said harbor, or leaving the same, shall be subject to pay to any licensed pilot performing duty on board, at the rate of three dollars per foot, or to the pilot who shall first speak to any steamer or vessel entering or leaving said harbor shall, if the vessel draws more than seven (7) feet of water, be entitled to half pilotage, and any vessel going out of said harbor drawing more than eight (8) feet of water, shall pay half pilotage, if any pilot offers to take her out. This rule shall apply to all steamers and vessels, whether owned by citizens of this State or not. That all steamers or vessels carrying the regular United States mail shall pay half pilotage only. That all steamers or vessels drawing less than seven (7) feet of water, and having a coastwise license, shall be exempt from paying whole or half pilotage, unless they employ a pilot.

Rule 5. That whenever any vessel is ready for the sea the pilot who brought her in shall have notice, and if such notice can not be given personally it shall be given by hoisting a jack at the foremast head twenty-four hours before leaving; when, if the pilot signaled does not come on board, the master may take the first pilot that may offer.

Rule 10. Any pilot who shall be detained at quarantine station on board of any vessel, shall be entitled to receive three dollars per day for every day so detained, which amount must be paid by the vessel he piloted into quarantine.

Rule 11. * * * It is hereby ordered by the Board of Commissioners that all vessels drawing eighteen feet or more shall pay for pilotage four dollars per foot and all vessels of less draught than eighteen feet shall pay three dollars per foot.

Extract from Rules and Regulations for Harbor Master.

Sec. 2. It shall be the duty of the master of every vessel arriving at Ship Island Harbor in ballast, to report the same immediately to the Harbor Master, whose duty it shall be to cause the said vessel to be discharged and the said ballast to be deposited at such place as the board of pilot commissioners may designate in water not more than six feet deep at low water.

Sec. 3. Any owner, master or person in charge of any vessel who shall permit, allow, or cause any ballast to be discharged or thrown overboard from such vessel into the waters of Ship Island Harbor shall be liable to a fine of one hundred and fifty dollars for the first offense and a fine of one thousand dollars for the second and each subsequent like offense, to be recovered before a court of competent jurisdiction; and the vessel from which said ballast may have been discharged and thrown overboard shall be liable to be proceeded against to recover the payment of said fines.

Sec. 5. The Harbor Master shall be entitled to a fee of five dollars on boarding each vessel and directing the disposition of ballast, and three dollars per day while superintending the discharge of said ballast, and for each service rendered at the request of the master a like fee of five dollars, and a fee of two dollars and fifty cents for each dispute or disagreement between masters of vessels settled by him.

ANCHORAGE FOR VESSELS.

Anchorage for vessels discharging ballast to embrace the following limits and rules governing same: East of a range of two beacons placed on the neck or flats on Ship Island to the eastward of the sand hills on the west end of said island and south of the buoy.

All vessels entering Ship Island Harbor having ballast to be discharged, it shall be the duty of the pilot having such vessel in charge to anchor her in a safe position within the above described limits, and for failure therein, unless he can show good and satisfactory cause to the pilot commissioners, he shall be fined in the sum of ten dollars for each offense.

If any vessel shall arrive in said harbor and not having a pilot on board, and such vessel should anchor outside the aforesaid anchorage, if she have ballast to be discharged, it shall be the duty of the Harbor Master before discharging any ballast to move said vessel to the ballast ground anchorage, and for such services he shall be entitled to collect from said vessel five dollars.

In case any vessel should be left anchored outside of the afore described limits of the ballast ground anchorage, by any pilot having her in charge, said pilot shall be notified twenty-four hours before the vessel is ready to discharge ballast and if he then fail to move the vessel to the proper anchorage immediately it shall be the duty of the Harbor Master to move her, for which service he shall collect five dollars from the vessel and the captain of said vessel may deduct the amount from the pilotage due, the pilot having failed to comply with these rules.

That any vessel having discharged ballast and wishing to move to the loading anchorage, if application is made to the Harbor Master to move the vessel, it shall be his duty to do so and secure her a good, free and safe berth for loading, and he shall be entitled to collect five dollars from the vessel for such service.

LOUISIANA.

PILOTS AND PILOTAGE.

Extracts from the revised laws of Louisiana.

Sec. 2690.—The master or owner of any ship or vessel, appearing in distress and in want of a pilot on the coast, shall pay unto any such branch pilot who shall have exerted himself for the preservation of such ship or vessel, such sum for extra service as the said owner or master and pilot can agree upon, provided said pilot boards said ship or vessel off pilot ground. In case no such agreement can be made the master and wardens, or any three of them, shall determine what is a reasonable reward which the pilot shall be entitled to collect.

Sec. 2692.—If any vessel outward bound shall carry off to sea, through the default of the master or owner of such vessel, any pilot, when a boat is attending to receive him, shall pay, besides the pilotage, the pilot the same monthly wages during the passage of such vessel as the chief mate is receiving; and said master or owners shall likewise pay said pilot's passage home on the first vessel clearing for this port or convenient to it.

RELATIVE TO THE PILOTS OF NEW ORLEANS.

Sec. 2703, as amended by Act 11, of 1890. The pilots of the port of New Orleans shall be entitled to ask and receive pilotage at the rate of three dollars and fifty cents for every foot of water drawn by any ship, or vessel, piloted by them, drawing ten feet of water or less and four dollars and fifty cents per foot for all vessels over ten feet of water up to eighteen feet of water, all vessels drawing over eighteen feet of water to pay same rate as vessels drawing eighteen feet and no more. Vessels of one hundred tons and under, lawfully engaged in the coasting trade of the United States shall not be required to take a pilot unless the master of such vessels demands pilot service.

APPENDIX I.

Sec. 2706. All vessels inward or outward bound to or from the port of New Orleans, except those mentioned in section two thousand seven hundred and three of this act, refusing to take a branch pilot when one offers, shall be liable to the branch pilot thus offering for half pilotage, * * *

Sec. 2709. Any branch pilot piloting any vessel safe from sea, and giving satisfaction, shall have a preference in piloting her out to sea again * * *

CALCASIEU.

Act 109 of 1894. Rates to be established by a board which will be in force after being published thirty days in any newspaper in the parishes of Calcasieu or Cameron. The board can make rules and regulations—but no pilotage shall be compulsory.

QUARANTINE.

The Governor of the State of Louisiana, by proclamation, declares when quarantine shall be established and prescribes rules and regulations for the government of State Quarantine. (See, also, National Quarantines in Appendix IV.)

The following rules for the navigation of South Pass are issued by the Secretary of War:

War Department, Washington City, December 14, 1881.

The following regulations relating to the navigation of the South Pass of the Mississippi River are hereby established for the protection of said Pass and the works for its improvement:

1. Steam vessels navigating the South Pass are required to reduce their speed to not exceeding 6 miles per hour between a point 500 yards above the South Pass Lighthouse and the headquarters building; and a similar reduction shall be made in other parts of the Pass when passing the boats, barges, floating mattresses, etc., that are being used in the construction of the jetties or the improvement of the channel, or in passing any other vessels, and after dark all vessels must slow down to 6 miles per hour throughout the entire Pass.

The South Pass is considered as embracing the entire extent of the channel between the upper ends of the works at the head of the Pass and the outer or sea end of the jetties at the entrance from the Gulf of Mexico.

The point referred to at 500 yards above the lighthouse, between which and the headquarters building vessels are required to reduce their speed, is marked by a post, painted white, on the western bank of the Pass.

2. All vessels anchoring in the Pass shall take position near the eastern bank of the Pass, not less than 500 yards above the lighthouse and below the island at the head of the Pass; and vessels so anchoring shall put out such extra moorings as may be necessary to prevent their being blown athwart the channel, and thus endangering the navigation of the Pass, whenever required to do so by the United States inspecting officer of the works for the improvement of the Pass.

3. No master or other person in command of a vessel drawing more than 12 feet of water shall enter the Jetty Channel from sea with such vessel until after a descending vessel, which has previously entered said channel from above, has passed to sea; and likewise no such vessel descending the river shall enter the channel at the head of the Pass until after an ascending vessel, which shall have passed the head of Goat Island, has passed through the entrance at the head of the Pass.

4. All upward-bound vessels must keep to the right or nearest the east bank of the Pass, giving the right of way to those bound in the opposite direction.

5. All vessels discharging or waiting to discharge ballast at Port Eads must be moored to the bank by lines, and no vessel shall discharge ballast into the Gulf of Mexico within a distance of 5 miles from the sea ends of the jetties; nor shall ashes or other refuse matter which may be liable to cause a shoaling or filling up of the South Pass be dumped therein.

6. The dredge boat *G. W. R. Bayley* shall have the exclusive right of way over all vessels navigating South Pass while she is at work therein, and all vessels in passing her must be governed by her signals. She shall give the usual steam-whistle signal for passing to her port or starboard, and this shall be responded to and obeyed by the passing vessel on the order of its master or pilot.

7. Towboats with tows are not permitted to go down the Pass after dark, but must anchor above the head of the Passes until after daylight.

ROBERT T. LINCOLN,
Secretary of War.

NEW ORLEANS.

Extracts from Ordinances fixing and regulating charges for wharfage.

Ordinance January 19, 1895.

Sec. 1. Upon all ships, and other decked vessels and steamships arriving from sea and landing or mooring at any wharf in the city, the charges shall be as follows:

On 1,000 tons and under.....	20 cents per ton.
Excess over 1,000 tons.....	15 cents per ton.
Steamships in Gulf of Mexico Trade	15 cents per ton.

Sec. 2. The same payments on ships or sail vessels shall be exacted as on steamships, and an extra charge of one-third these rates shall be paid by all sail vessels or steamships which may remain in port over two months, the same to be recovered before departure, and if they remain over four months, an additional charge of one-third these rates per term of two months from arrival to departure.

Amended May 27, 1881.

Ocean steamships shall pay at the rate of 15 cents per ton, for the first two months or less. Ocean vessels arriving in ballast shall not be charged wharfage during the time they may be engaged in unloading, but which period shall not exceed five days from time of arrival; provided, said ballast be sold to the city or wharf lessee.

Vessels arriving in ballast, and loading exclusively with grain, shall not pay more than five cents per ton for the first fifteen days, and one-third of one cent per day for each additional lay day.

TEXAS.

PILOTS AND PILOTAGE.

Extracts from the Texas Civil Statutes, 1888.

Art. 3649. Rates of Pilotage, etc. The rate of pilotage on any class of vessels shall not in any port of this State exceed four dollars for each foot of water which the vessel at the time of piloting draws, and whenever a vessel, except of the classes below excepted, shall decline the service of a pilot offered outside the bar, and shall enter the port without the aid of one, she shall be liable to the first pilot whose services she so declined for the payment of half-pilotage; and any vessel which after being brought in by a pilot shall go out without employing one shall be liable to the payment of half-pilotage to the pilot who brought her in, or if she has come in without the aid of a pilot, though offered outside, she shall in so going out be liable for the payment of half-pilotage to the pilot who had first offered his services before she came in; but if she has come in without the aid of a pilot, or the offer of it outside, she shall in case of going out without a pilot not be liable to half-pilotage. At any port where vessels shall receive or discharge their cargoes at an anchorage outside the bar, such vessel shall be liable for pilotage at the above rate to such anchorage, but shall not be liable for or compelled to pay pilotage from such anchorage to the open sea; and if any vessel bound from the open sea to such anchorage while under way shall decline the services of a pilot, and shall afterwards receive or discharge any portion of her cargo at such anchorage on the lighters or otherwise, she shall be liable for the payment of half-pilotage at the above rates to such anchorage to the first pilot whose services shall have been tendered to and declined by her, but not liable for any pilotage from such anchorage to the open sea; and when a pilot takes charge of a vessel 20 miles outside of the bar and brings her to it, he shall be entitled to one-fourth pilotage for such offshore service, in addition to what he is entitled to recover for bringing her in; but if such offshore service be declined no portion of such compensation shall be recovered.

Art. 3650. Exemption from extra pilotage. The following classes of vessels shall be free from any charge for pilotage, unless for actual service, to wit: All vessels of twenty tons and under; all vessels of whatsoever burthen, owned in the State of Texas and registered and licensed in the district of Texas, when arriving from or departing to any port in the State of Texas; all vessels of seventy-five tons and under, owned and licensed for the coasting trade in any part of the United States, when arriving from or departing to any port in the State of Texas; all vessels of seventy-five tons and under, owned in the State of Texas and licensed for the coasting trade in the district of Texas, when arriving from or departing to any port in the United States.

Art. 3651. Consignee responsible for pilotage. The consignee of any vessel shall be held responsible for the pilotage of said vessel.

Art. 3655. Pilots for Matagorda and Lavaca bays. * * *

Art. 3657. Pilotage for said bays. The rate of pilotage for said bays shall be two dollars and fifty cents for each foot of water the vessel may draw at the time of piloting; and all vessels that may draw five feet or more, shall be subject to pay any licensed pilot for said bays, whose services are tendered and declined, one-half the pilotage herein prescribed.

Art. 3658. All the provisions of this chapter relating to branch pilots at ports, in so far as the same are applicable and not expressly qualified, shall apply to and govern pilots appointed for the mouth of the Brazos River and for Matagorda and Lavaca bays.

QUARANTINE.

The Governor of the State of Texas, by proclamation, declares when quarantine shall be established and prescribes rules for the government of State Quarantine. (See, also, National Quarantines in Appendix IV.)

GALVESTON HARBOR.

Extracts from an ordinance prescribing rules and regulations for the government of the harbor and port of Galveston.

Sec. 1. That no vessel or steamer coming into the harbor of Galveston shall be allowed to lay in stream in front of the wharves, north, for a longer time than twenty-four hours preparatory to hauling into a berth at the wharves; and that no vessel preparing to go to sea shall be allowed to lay in the stream, in front of the wharves, for a longer time than twenty-four hours after leaving her berth at the wharf.

Sec. 2. That all vessels lying in the stream shall keep their small boats hauled up alongside, or hoisted up to the davits, and during the night shall show a proper light.

Sec. 3. That all vessels hauling into the wharves shall have their yards topped, anchor flukes taken inboard or stoppered at the hause pipes; cables bent and clear with ten fathoms range of chain overhauled; jib and flying jib boom rigged in; stern and quarter davits and bumpkins turned in or unshipped. And that all vessels of seventy-five tons and upward, on arriving in the stream of the port of Galveston, shall, before hauling into berth, and within twenty-four hours after such arrival, report at the harbor master's office and book for berth.

Sec. 4. That no vessel or steamer shall be allowed, while anchored in the stream in front of the wharves, between lines running north from the shore at the foot of Twenty-third street, across the channel, in the west, and from the foot of Sixteenth street in the east, to receive or deliver ballast or cargo of any description, except as may be hereinafter provided.

Sec. 6. That all vessels, steamers, and barges shall keep a good and proper ship keeper at all times on board.

Sec. 10. That no person shall cast or deposit or suffer to be cast or deposited in the harbor of said city any stone, gravel, earth, ashes, or other like substance, or any filth, logs or like floating things, or create any obstruction therein, under a penalty of a fine of not more than twenty-five nor less than ten dollars for each and every offense.

Sec. 11. That said harbor master shall have power to regulate and station all ships or other vessels in the harbor, within the port and corporate limits of the city of Galveston, and at the wharves thereof or moored or anchored near thereto, and in such proximity to other shipping as to affect the same in case of fires, * * *

Sec. 13. That no vessel shall be allowed to moor within a cable length of any wharf, and no vessel whatever between the wharves of said city and outer bar shall throw overboard any stone or other ballast below high-water mark; and all ballast shall be landed fairly on the shore, and at the time of landing or discharging care must be taken not to drop any part thereof overboard, nor shall any ballast be unloaded at night. That no pitch, tar, or other combustible shall be heated on board of any vessel, but such heating must be done on stages and boats removable in case of accident.

Sec. 14. That any vessel or steamer containing gun or other explosive powder shall discharge the same upon the dock west of Twenty-ninth (29th) street by small boats or lighters, and that it shall be the duty of the consignee to remove the same as fast as it may be landed. That vessels containing or having on board less than one-half ton of such powder shall be exempt from the provisions hereof.

FOR THE INFORMATION OF SHIPMASTERS.

All vessels lying at a wharf not engaged in receiving or discharging cargo will be charged wharfage at the rate of five cents per ton per day.

APPENDIX II.

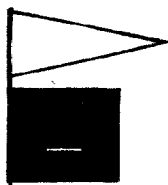
WIND SIGNALS OF THE U. S. WEATHER BUREAU.

STORM SIGNALS ALONG THE SEACOAST.

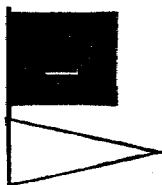
A red flag with black center indicates that the storm is expected to be of marked violence.

The pennants displayed with the flags indicate the direction of the wind; red, easterly winds; white, westerly winds. The pennant above the flag indicates that the wind is expected to blow from the northerly quadrant; below, from the southerly quadrant.

STORM SIGNALS.



Northwesterly winds.



Southwesterly winds.



Northeasterly winds.



Southeasterly winds.

By night a red light will indicate easterly winds and a white light above a red light will indicate westerly winds.

The "**Information Signal**" consists of a red pennant of the same dimensions as the red and the white pennants (direction signals) and when displayed indicates that the local observer has received information from the central office of a storm covering a limited area, dangerous only for vessels about to sail to certain points. The signal will serve as a notification to shipmasters that the necessary information will be given them upon application to the local observer.



Hurricane.

The "**Hurricane Signal**" denotes the expected approach of a hurricane or of one of the severe and dangerous storms that occasionally move across the Gulf of Mexico and along the Atlantic Coast.

APPENDIX III.

WEST INDIA HURRICANES IN THE GULF OF MEXICO.*

These are cyclonic storms with a center of lowest barometer around which the wind blows in a more or less circular course (spirally) in a direction contrary to the hands of a watch; at the same time the storm field advances on a straight or curved track, sometimes with great velocity, and sometimes not more than a few miles in an hour, occasionally, in appearance, coming to a pause in its onward movement; the estimated average velocity in the Gulf of Mexico is about 17 miles per hour. Hurricanes form to the eastward of the Windward Islands and take a northwesterly course; some curve gradually to the northward passing north of the island of Cuba and along the Atlantic Coast of the United States; others pass over or to the southward of Cuba and enter the Gulf of Mexico, and while in the gulf curve to the northward or northeastward so as to strike the coast somewhere between Tampa, Fla., and the Rio Grande. The months during which hurricanes are encountered in the Gulf of Mexico are July, August, September, and October, while they have been known to occur in June and November. During these months mariners should be on the watch for indications of a hurricane, and should frequently and carefully observe and record the barometer.

Indications of the approach of a hurricane.—Hurricanes entering the east gulf have a widespread influence, and, as the storm moves westward in the lower gulf, easterly winds prevail along the upper Gulf Coast, becoming stronger, with a rapidly falling barometer, as the storm curves to the northward. In the east gulf a persistent northeasterly wind, with a falling barometer, is almost a positive indication of a disturbance to the southward, and great vigilance should be exercised. The approach of a hurricane is usually indicated by the ugly, threatening appearance of the weather, the increasing number and severity of the squalls, and the increasing force of the winds. These signs are sometimes preceded by a long, heavy swell and confused sea, which comes from the direction of the hurricane's approach and travels more rapidly than the storm center. The best and surest warning, however, is given by the barometer; during the hurricane season a decided fall and also sharp and irregular oscillations of the mercury, accompanied by any of the above signs, are indications of an approaching storm. As the storm center approaches, unless the vessel is on the line of its advance, the force of the wind increases and the changes in its direction become more rapid; and when in or near the center the wind flies round at once to opposite points of the compass, the sea breaking in confused, mountainous heaps. A vessel on the line of the storm's advance will experience the above indications, except that, as the storm center approaches, the wind will remain steady, or nearly so, from one direction until the vessel is close-to, or in, the center.

The distance from the center of a hurricane can only be guessed at by watching the increase in the violence of the wind, the rapidity of its changes, and the falling of the barometer. If the barometer falls slowly, and the wind increases gradually, it may reasonably be supposed that the center is distant; with a rapidly falling barometer and increasing bad weather the center may be supposed to be approaching dangerously near. The following table, from Piddington's Sailor's Horn-book, may be of some use to the mariner at the approach of a hurricane to estimate his distance (approximately) from the center:

Average fall of the barometer per hour.	Distance from the center, in miles.
From 0.02 to 0.06-----	250 to 150
From 0.06 to 0.08-----	150 to 100
From 0.08 to 0.12-----	100 to 80
From 0.12 to 0.15-----	80 to 50

Consult also the diagrams on page 126.

Few vessels have passed through the center of a hurricane without the loss of masts or rudder, or meeting with some worse disaster, and, at whatever cost, the center of the storm field should be avoided.

*Compiled from Piddington's Sailor's Horn-book; American Practical Navigator; Barometer Manual for the use of Seamen; Publications of the United States Hydrographic Office, Navy Department; and remarks of officials of the United States Weather Bureau stationed on the Gulf Coast of the United States.

WEST INDIAN HURRICANES.

(From the Pilot Chart of the North Atlantic Ocean, September, 1887.)

DIAGRAM A.—Illustrating the circulation of the wind towards and around the center of a tropical hurricane, northern hemisphere. The dangerous winds occur in the inner whirls.

DIAGRAM B.—For practical use in finding a ship's position relative to the center of a tropical hurricane, northern hemisphere, by means of the direction of the wind and fall of the barometer.

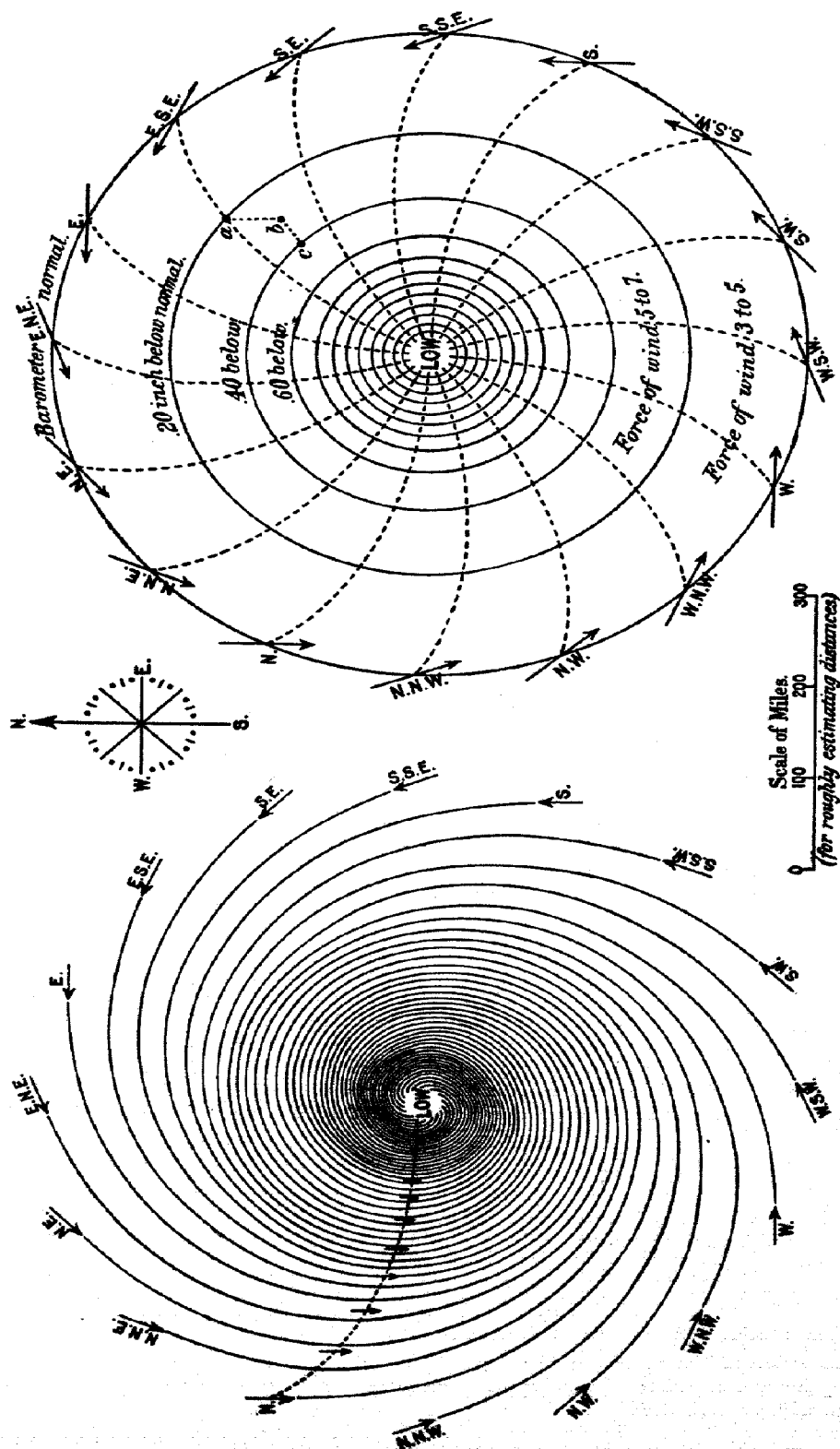


DIAGRAM A.

The spiral lines illustrate the circulation of the wind in a tropical cyclone, northern hemisphere. The diameter of the area represented may vary in different storms and in different latitudes from about 100 to about 800 miles, and is generally least in low latitudes. The air is drawn in toward the center of low barometer, gradually takes up a more and more nearly circular path as its velocity increases, and finally whirls around the center with hurricane force. At the center is a calm spot from 10 to 80 miles in diameter; this is marked Low, and here the lowest barometer reading is obtained. It will be noticed how similar the motion is to that of water in a whirlpool or eddy, and very naturally, as this is nothing but a gigantic whirlpool in the atmosphere, with the suction or draft at the center upward instead of downward. The direction of the wind at any point on this diagram is the same as the direction of the curve at that point, and the arrows show this direction at the points where they are plotted. By plotting arrows at all points having the wind from the same direction, north for example, and joining them by a dotted line, we find that this dotted line curves toward the center, as shown. The angle of bearing of the center therefore gradually decreases from about 10 points to about 8 points in the inner whirls, where the well-known "8-point rule" becomes true.

PRACTICAL USE OF DIAGRAM B.

Suppose that at 4 p.m., for instance, the wind is ESE, and the barometer .20 inch below the normal: Find at the margin of the diagram the wind-arrow marked "ESE," and follow the dotted line in toward the center as far as the isobar marked ".20 inch below normal"; this intersection (marked *a*) is your position on the diagram; for, by the method of construction just explained, this is the place, and the only place, where the wind is ESE, and at the same time, the barometer .20 inch below the normal. Referring to the compass and scale which accompany the diagram, you will find that the center (Low) bears SW. by S., distant 250 miles. Plot this 4 p.m. position of the center on your track chart, from the 4 p.m. position of your vessel.

Later in the day, say 8 p.m., suppose that the wind is SE. by E., and the barometer is .30 inch below the normal (having fallen .10 during the interval): With this wind your position must be halfway between the dotted lines leading in toward the center from the arrows marked "SE." and "ESE.," and with this barometer reading it must be halfway between the isobars marked ".20 inch below normal" and ".40 below"; it is therefore at the point marked *b*, and the center bears SW., distant 200 miles. Plot this 8 p.m. position of the

DIAGRAM B.

Here dotted lines are drawn from each wind-arrow at the margin to the center, in the way shown above, so that to find a direction of the wind at any point follow the dotted line out to the margin and read it there. The circles are isobars, and the barometer falls .20 inch as you go from one of these circles to the next inner one. This illustrates very clearly the rate at which the barometer falls as you approach the center—at first slowly, as the broad outer ring is traversed, then more and more rapidly. Near the center, where the isobars are very close together, it has been known to fall an inch in 50 miles. Of course as you recede from the center the barometer rises .20 inch as you pass from one isobar to the next outer one, just as it fell on entering the hurricane. This diagram involves as much of our latest knowledge of cyclones as can be safely used as a general guide, and extends out beyond the regions where the barometer is falling rapidly and the wind and sea have become violent. No attempt will be made to draw up a set of rules for action, but only to indicate how to plot your position on the diagram and obtain from it the probable bearing and distance of the center and the track and velocity of the storm, leaving it to yourself to decide what action to take, having proper regard to the strength and speed of your ship, the lay of the land, and the passage you are making.

PRACTICAL USE OF DIAGRAM B.
cyclone center on your track chart, from the 8 p.m. position of your vessel. You thus have the position of the cyclone center at 4 p.m. and at 8 p.m. plotted on your chart, and the line joining the two positions is the track of the center and distance it has moved in four hours.

Suppose again, that at 10 p.m. the wind is still from SE. by E., but the barometer stands .40 inch below normal, having fallen .10 in two hours. Your position is now at the point marked *c* on the diagram, found by exactly the same course of reasoning as before, and the center now bears SW., distant about 175 miles. Plot this 10 p.m. position of the cyclone center on your track chart, from the 10 p.m. position of your vessel. If you have been lying to, this will evidently indicate that the storm's track has recurved, and that you are directly in front of the center. But no matter whether you have been lying to or not, your vessel's track and position at any time, and the track and position of the cyclone center, are both plotted on your chart, and you can closely watch every change of relative position in order to avoid the center and dangerous semicircle of the hurricane.

Bearing of center and rules for avoiding it.—When the weather and the barometer indicate the approach of a hurricane, face the wind; the center will then bear 8 points to the right from the direction of the wind (at a considerable distance from the center, and before the barometer has fallen much below the normal, the center may bear 10 or 12 points to the right of the wind direction). Having the bearing of the center, shorten sail, or heave-to, and closely watch the barometer and the direction in which the wind shifts. In speaking of the shift of wind, such a shift is meant as would be observed on a vessel hove-to; for, if the vessel be moving faster than the storm (which is easily possible), and in the same direction, the observed shift may be contrary to what it would be if the vessel were hove-to.

If the wind shifts with the hands of a watch, the vessel is in the right semicircle of the hurricane. The vessel should then be hauled by the wind on the starboard tack and sail carried as long as possible; if obliged to heave-to, do so on the starboard tack.

If the wind shifts against the hands of a watch, the vessel is in the left semicircle of the hurricane; the wind should be brought on the starboard quarter, the direction of the vessel's head noted, and that course steered. If obliged to heave-to, do so on the port tack.

If there is no perceptible change in the direction of the wind but it increases in violence, with a falling barometer, the vessel is directly in front, and on the track, of the storm. The vessel should be put before the wind, the direction of her head noted, and that course steered, trimming sail as the wind shifts to the starboard quarter. If obliged to heave-to, do so on the port tack.

If there is no perceptible change in the direction of the wind and it is moderating, with a rising barometer, the vessel is on the storm track but in rear of the center. In this case the safest rule is to run out with wind on the starboard quarter, or heave to on starboard tack. Advantage can be taken of favorable wind, but the greatest care must be exercised to avoid running into the storm. (See, also, remarks following.)

Remarks.—In the Gulf of Mexico, when looking in the direction in which the storm is traveling, the dangerous semicircle is on the right hand side of the storm track; in other words, the semicircle in which the wind shifts with the hands of a watch is the more dangerous part of the storm, and for the following reasons: Because the progressive movement of the storm increases the velocity of the wind in the right semicircle (the velocity of the wind in the left semicircle being correspondingly decreased); because both wind and current tend to carry the vessel in front of the storm, and if obliged to scud she will drive into greater danger; and because the right side is the one toward which the storm track is liable to recurve at any time.

In some cases vessels may, if the storm be traveling slowly, sail from the dangerous semicircle across the front of the storm and out of its influence. But, as the rate at which the storm travels along its track is uncertain, this is an extremely hazardous undertaking; the mariner should carefully consider all the circumstances, particularly the rate at which the barometer is falling, before he attempts to cross.

Vessels at anchor in any of the harbors, at the approach of a hurricane, should send down their spars and take every precaution, watching the wind as it shifts, and, if possible, lay their anchors so as to lie with an open hawse.

APPENDIX IV.

REGULATIONS U. S. MARINE-HOSPITAL SERVICE.†

APPROVED MAY 20, 1889.

(EXTRACTS.)

GENERAL DUTIES OF MEDICAL OFFICERS.

84. The duties of officers of the medical corps are professional, sanitary, and executive. General duties.

85. The professional duties of a medical officer are to examine all applicants for relief, to prescribe and furnish medicine or hospital treatment as may be required, and to make physical examinations of seamen of the several Government services and merchant marine, under such regulations as shall hereinafter appear. Professional duties.

PROFESSIONAL DUTIES.

88. Medical officers will, upon the application of any United States shipping commissioner, or the master or owner of any United States vessel engaged in the foreign trade, or of any passenger steamer engaged in the coasting or inland navigation trade, examine as to his physical condition any seaman brought to them for that purpose, and will give a certificate (Form 1928) as to his fitness or unfitness for service. They will physically examine, in accordance with existing regulations governing the physical examination of American seamen, any foreign seamen sent them for that purpose by the duly authorized agent of a foreign line or the consul representing the nation to which the vessel belongs. A fee of fifty cents will be charged for such examinations of foreign seamen. * * * Medical officers will also, upon the application of the proper officers, examine enlisted men and persons desiring to enlist in the Revenue Marine, Life Saving, Coast Survey, and Lighthouse Services, or to instruct them in the mode of resuscitating persons apparently drowned. No fee will be charged for this service. To examine applicants for relief, and certain other persons as to physical qualifications for enlistment in Government service.

89. Medical inspections of seamen, with reference to their fitness for service, will be made only at the respective marine-hospital offices, except at certain stations * * * in special cases. Examinations to be made at offices.

90. No fee will be charged by any medical officer of the Marine-Hospital Service for the medical inspection of any American seaman or for making a certificate as to his physical condition. No fee to be charged.

91. When requested by the local inspectors of steam vessels or other proper officers, medical officers and acting assistant surgeons will examine applicants for pilots' license as to acuteness of hearing, color blindness, and general visual capacity, and will give a certificate accordingly. Color blindness and visual tests.

SANITARY DUTIES.

95. Upon the outbreak of epidemic smallpox at or near a relief-station, medical officers and acting assistant surgeons will vaccinate such seamen as may come to the marine-hospital office for the purpose; and officers are authorized, at all times, to visit vessels to examine and vaccinate crews. * * * To vaccinate seamen.

RELIEF-STATIONS.

133. A relief-station of the Marine-Hospital Service is a port situated on any navigable water of the United States where an officer of the customs or Marine-Hospital Service is on duty. Definition.

134. All relief-stations, where the service is under the charge of a medical officer of the Marine-Hospital Service shall be known as relief-stations of Class 1. Relief-stations where specific arrangements have been made for the care and treatment of sick or disabled seamen at rates fixed by the Treasury Classes.

†The Marine-Hospital Service is the medical department for the mercantile marine of the United States. It was established in 1798, and is charged with preserving the health interests of the officers and seamen employed on American vessels engaged in the foreign, coastwise, and inland commerce.

APPENDIX IV.

Department, but where collectors of customs, on account of the absence of a medical officer of the service, are authorized and required to issue permits and to supervise the relief furnished, shall be known as relief-stations of Class 2. All other ports where there are officers of the customs revenue, but where, on account of the infrequency of application for relief, the absence of any hospital, or from other causes, sick or disabled seamen are cared for only in cases of emergency, shall be known as relief-stations of Class 3.

Districts.

135. The relief-stations of the Marine-Hospital Service are grouped into eight districts, as follows: The District of the North Atlantic, the District of the Middle Atlantic, the District of the South Atlantic, the District of the Gulf, the District of the Ohio, the District of the Mississippi, the District of the Great Lakes, and the District of the Pacific.

Gulf.

139. The District of the Gulf embraces the following-named relief-stations or ports, viz: Apalachicola, Fla.; Brownsville, Tex.; Corpus Christi, Tex.; Galveston, Tex.; Key West, Fla.; Mobile, Ala.; New Orleans, La.; Pensacola, Fla.; Port Tampa, Fla.†

Location of offices and dispensaries.

147. The marine-hospital dispensary shall be located at the custom-house whenever practicable, and suitable office room for that purpose will be set apart, * * * subject to the approval of the Secretary of the Treasury.

**BENEFICIARIES OF THE SERVICE, AND THE MANNER IN WHICH
RELIEF IS EXTENDED TO THEM.**

List of persons entitled to relief.

149. The persons entitled to the benefits of the Marine-Hospital Service are those employed on board in the care, preservation, or navigation of any vessel of the United States, or in the service, on board, of those engaged in such care, preservation, or navigation, excepting persons employed in or connected with the navigation, management, or use of canal boats engaged in the coasting trade.

Wrecked seamen entitled.

150. Seamen taken from wrecked vessels under the United States flag, if sick or disabled, are entitled to the benefits of the Marine-Hospital Service and will be furnished care and treatment without reference to the length of time for which they have been employed.

Seamen sent by consular officers entitled.

151. Destitute American seamen returned to the United States from foreign ports by United States consular officers, if sick or disabled at the time of their arrival in a port of the United States, shall be entitled to the benefits of the Marine-Hospital Service.

Seamen must make application for relief.

152. A sick or disabled seaman, in order to obtain the benefits of the Marine-Hospital Service, must apply to a medical officer of that service, or, in the absence of such officer, then to the proper customs officer, * * * and must furnish satisfactory evidence that he is entitled to relief under the regulations.

Evidence to be presented by applicant.
Form 1914.

153. Masters' certificates and discharge papers from United States shipping commissioners, properly made out and signed, showing that the applicant has been employed on a documented vessel or vessels of the United States for at least sixty days immediately preceding his application for relief, shall, in general, be held to constitute the "satisfactory evidence" required.

Certificates from owners or agents as evidence.

154. The certificate of the owner or accredited commercial agent of a vessel as to the facts of the employment of any seaman on said vessel may be accepted as evidence in lieu of the master's certificate in cases where the latter is not procurable.

Masters enjoined to furnish certificate of service.

155. Masters of vessels of the United States shall, on demand, furnish any seaman who has been employed on such vessel a certificate (Form 1914) of the length of time said seaman has been so employed, giving the date of his last employment and the date of his discharge. This certificate will be filed in the marine-hospital office, or office of the customs officer, upon application being made for relief, whether the relief is furnished or the claim rejected.

Masters refusing to give certificate.

156. In case the master of any vessel shall fail or refuse to furnish a master's certificate to any seaman that may have been employed on board said vessel within thirty days preceding the seaman's application for relief, the collector of customs shall cause said master, if he be in port, to appear at the marine-hospital office and produce the ship's books. Any master of a vessel who shall furnish a false certificate of service, with the intent to procure the admission of a seaman into any marine hospital, shall be immediately reported to the nearest United States attorney for prosecution.

† Contracts, at different places, for the care of seamen entitled to relief from the Marine-Hospital Service are made annually and the right is reserved by the Secretary of the Treasury to terminate any contract whenever the interests of the service require it.

157. Any seaman who is able to write will be expected to sign his name upon the face of the master's certificate issued to him before said certificate is signed by the master of the vessel. Seamen to sign certificate.

158. During the season when navigation is open at any port, seamen at that port are not entitled to relief from the Marine-Hospital Service, who, from any cause other than disease or injury, have not, within the sixty days immediately preceding the application for relief, been employed on any American vessel. Requirements as to service.

159. When an interval has occurred in the applicant's seafaring service by reason of the closure of navigation, such interval shall not be considered as excluding him from relief, except the sickness or injury for which he applies for relief be the direct result of employment on shore, nor shall the phrase "immediately preceding the application" be held as excluding from relief a seaman who has been but a few days away from his vessel, provided he has not abandoned his vocation as seaman; nor as excluding a seaman who may have been not exceeding two months away from his vessel, providing it be satisfactorily shown that such absence was due to sickness. Exceptions.

160. During the season when navigation is closed at any port, seamen at that port are not entitled to relief from the Marine-Hospital Service, who, from any cause other than disease or injury, have not been employed on board an American vessel within a period exceeding thirty days prior to the closure of navigation. Closure of navigation.

161. A seaman who has abandoned his vocation for any employment on shore for a period of two months or more, unless debarred from shipping by reason of sickness, disability, or closure of navigation, has thereby forfeited his claim to the benefits of the Marine-Hospital Service. Forfeiture of claims for abandoning vocation.

162. Whenever an applicant for relief presents himself at the marine-hospital office or the custom-house without a master's certificate or shipping commissioner's discharge, and it is impracticable to obtain a master's certificate on account of the absence of the vessel or its master from the port, the affidavit of the applicant as to the facts of his last employment may be accepted as evidence in support of his claim for benefits of the Marine-Hospital Service. The applicant's affidavit may also be accepted as evidence in cases where the period of his last service, as shown by his papers, is less than sixty days. Affidavits may be accepted as evidence.

163. When the period of the seaman's service on last vessel is less than two months, his statement as to previous service may be accepted if supported by satisfactory evidence. Brief service on last vessel not a bar to relief.

169. The expenses of caring for sick and disabled seamen incurred during a voyage will not be paid from the marine-hospital fund. Expenses for sickness during voyage.

170. No relief will be furnished at the expense of the marine-hospital fund, except upon the certificate and recommendation of a medical officer of the Marine-Hospital Service, or of a competent physician, showing that the applicant requires medical treatment. Relief only upon certificate of officers.

171. In no case will money be paid to a seaman himself, or to his family or friends, out of the marine-hospital fund, as reimbursement for expenses incurred during sickness or disability. Money not to be paid to seamen for expenses of sickness.

172. The expenses for the care and treatment of seamen entitled to the benefits of the Marine-Hospital Service, who, in accordance with the State or municipal health laws and regulations, are taken to quarantine or other hospitals under charge of the local health authorities, will not be paid from the marine-hospital fund. Seamen admitted to quarantine hospitals.

DISPENSARY RELIEF.

173. Sick and disabled seamen entitled under these regulations to the benefits of the Marine-Hospital Service whose diseases or injuries are of such a nature that they can properly be relieved by medicine, or dressing, or advice, without admission to hospital, will be treated as out-patients, and furnished medicines, dressings, surgical appliances, or advice, as the case may require. Cases to be treated at dispensary as out-patients.

174. Seamen will not be furnished relief at their own homes, except by special authority from the Supervising Surgeon-General of the Marine-Hospital Service, and then an allowance for medical attendance and medicines only will be made at rates fixed by the Treasury Department. No relief furnished at homes of patients.

STATIONS OF THE THIRD CLASS.

177. Whenever, at a third-class relief-station, an application for relief is presented, the customs officers for the port are authorized and directed to Provisions for relief.

cause outdoor or office relief (medicines, surgical appliances, etc.) to be furnished in accordance with paragraph 173, or to furnish transportation to a relief-station of the first or second class, as the case may be. But when the amount of the appropriation is insufficient any relief-station of the third class may be discontinued.

Temporary arrangements to be made.

178. Whenever, in the opinion of the examining physician, the patient is unable to bear transportation without prejudice to his recovery, the facts will be at once reported to the Supervising Surgeon-General for instructions, and in case immediate medical or surgical attendance is necessary, the customs officer will, pending action upon the case, provide it, if possible, at reasonable and just rates. The customs officer will in such cases employ a competent physician to take professional charge of the patient, and will arrange for suitable quarters, nursing, and diet for the patient, and the arrangements made by him will be reported, together with the rates of charges therefor.

Foreign seaman *et al.* not treated.

181. Foreign seamen, or employees of the various Government services, will not be treated at stations of the third class.

HOSPITAL RELIEF.

Cases for hospital treatment.

184. A sick or disabled seaman entitled to the benefits of the Marine-Hospital Service shall be admitted to hospital only in cases where the gravity of the disease or injury from which he suffers is such as to require hospital treatment in the opinion of a medical officer or acting assistant surgeon of the service, or of a reputable physician designated by the Department to act at a place where no medical officer is stationed.

STATIONS OF THE FIRST CLASS.

Bed-tickets to be issued. Form 1917.

185. At the relief-stations where United States marine hospitals are located, the bed-ticket will be prepared at the marine-hospital office and given to the patient, and the patient will be admitted on presentation of said bed ticket inclosed in a sealed envelope.

To be valid only for day of issue.

186. The bed-ticket, * * * unless presented, on the day it is issued, * * * will be forfeited.

STATIONS OF THE SECOND CLASS.

Permits for hospital relief. Form 1916.

194. Customs officers or acting assistant surgeons will issue hospital permits for the care and treatment of such applicants as may be found to be entitled to the benefits of the service and require hospital treatment. * * *

Permits valid only on day of issue.

196. The hospital permit, before being delivered to the applicant for relief, must be inclosed in an envelope, sealed, and addressed to the medical officer or other person authorized to receive the patient. The seaman should at the same time be informed that unless presented on the day it is issued the permit will be forfeited.

Applications for relief after office hours.

197. When, at a second-class station, a seaman entitled to the benefits of the service makes application for admission to hospital after the custom-house or dispensary is closed for the day, the surgeon in charge of the hospital in which the patients of the Marine-Hospital Service are treated may receive the patient, should the case be urgent. * * *

Permits may be antedated.

198. In no case will a permit be antedated, except as provided in the foregoing paragraph, and only to cover one working day exclusive of legal holidays.

Relief not to be given on antedated permits.

199. Sick and disabled seamen presenting themselves at any hospital where patients of the Marine-Hospital Service are cared for, with hospital permits dated prior to the day when presented, will not be treated at the expense of the marine-hospital fund, except under such provisions as are prescribed by these regulations.

Relief not to exceed sixty days.

200. Continuous relief for periods exceeding sixty days will in no case be granted, except by special authority from the Department.

STATIONS OF THE THIRD CLASS.

Emergency cases only treated in hospital.

207. Hospital relief at stations of the third class will not be furnished except in cases of emergency and for a temporary period, under the special provisions of paragraph 178 of these regulations.

INSANE SEAMEN.

212. Insane seamen entitled to the benefits of the Marine-Hospital Service may be admitted to the Government Hospital for the Insane upon the order of the Secretary of the Treasury, and the officers in charge of relief-stations will report to the Supervising Surgeon General any application for admission to hospital made in behalf of such seamen, and any cases of insanity that may occur among them. * * *

Relief for insane seamen.
March 3, 1875, a. 5.

DECEASED SEAMEN.

213. On the death of a patient while under the charge of the Marine-Hospital Service, notice to receive his effects shall be given by letter, or otherwise, to his nearest known relative. * * *

Relatives to be notified.

216. The necessary expenses of a plain burial for deceased patients of the service will be paid; but no part of the expenses of the burial of any deceased seaman will be paid for at the expense of the marine-hospital fund, unless said seaman was at the time of his death a patient of the service.

Burial expenses.

FOREIGN SEAMEN AND EMPLOYEES OF GOVERNMENT SERVICES.

217. The accommodations provided for the care and treatment of the patients of the Marine-Hospital Service are also available to foreign seamen only at relief-stations where medical officers or acting assistant surgeons are on duty, upon the application of the consular officers of their respective nationalities, or upon the application by the masters of the vessels upon which said seamen serve, provided satisfactory security is given for the payment of the expenses of such care and treatment. * * *

Foreign seamen may be treated.

218. Seamen employed on vessels of the Navy, or the Coast Survey, may be admitted for care and treatment as patients of the Marine-Hospital Service only upon the written request of their respective commanding officers. * * * Officers and seamen of the Revenue-Cutter Service will be admitted to care and treatment at all stations of the first class, without reference to length of service, and without charge.†

Seamen of various government services may be admitted.

221. Customs officers acting as agents of the Marine-Hospital Service will collect all bills for the care and treatment of foreign seamen by the Marine-Hospital Service. * * *

* * * * * accounts.

TONNAGE DUES.

304. Customs officers will collect from vessels arriving in the United States from any foreign port of North America north of the southern terminus of the Isthmus of Darien, or any port in New Foundland, the West Indian, Bahama, Bermuda, or Sandwich Islands, a duty of three cents per ton on every entry; but the total tax in any one year on entries from the ports specified is not to exceed fifteen cents. The tax to be collected on vessels making entry on arrival from other foreign ports is six cents per ton on every entry; but the total tax collected at six cents per ton is not to exceed thirty cents per ton in any one year.

Rates for assessment.
U. S. Stat., c. 121, 1884,
Act June 26.

305. Any vessel making such voyages as to become liable in any one year under both rates—that is, at three cents per ton and six cents per ton—shall not be held liable to an aggregate tax of more than thirty cents per ton for any one year, reckoned from the date of the entry and payment of her first tax at either rate; but the three-cent tax per ton shall not be collected on more than five entries in any one year.

Number of times tax may be assessed.

306. For half a ton or more than half a ton of the measurement of a vessel, collection will be made at the full rates of three or six cents per ton; for less than a half ton, no collection will be made.

Small craft exempt.

307. As provided by the act of June 26, 1884, "that the President of the United States shall suspend the collection of so much of the duty herein imposed on vessels entered from any port in the Dominion of Canada, Newfoundland, the Bahama Islands, the Bermuda Islands, the West India Islands, Mexico, and Central America, down to and including Aspinwall and Panama, as may be in excess of the tonnage and lighthouse dues, or other equivalent tax or taxes, imposed on American vessels by the government of the foreign country in which such port is situated, and shall upon the passage of this act, and from time to time thereafter as often as it may become necessary by reason of changes in the laws of the foreign countries above mentioned,

Dues suspended reciprocally.

† Officers and crews of vessels of the Lighthouse Establishment and Mississippi River Commission are admitted for care and treatment upon the application of their respective commanding officers.—(Treasury Department Circulars No. 120, 1886; No. 3, 1888.)

indicate by proclamation the ports to which such suspension shall apply, and the rate or rates of tonnage duty, if any, to be collected under such suspension," but customs officers will take no action by way of suspension of collection of tax till they have been informed that such suspension has been authorized by a proclamation of the President.

NATIONAL QUARANTINES.

Permanent quaran-
tines.
Act Aug. 1, 1888.

325. The following permanent quarantines have been established according to law: One at the mouth of Delaware Bay; one near Cape Charles at the entrance of Chesapeake Bay; one at Southport, N. C.; one on Blackbeard Island in Sapelo Sound; one at Garden and Bird Keys, Tortugas Islands; one at Ship Island. * * *

Pilots and others must
obey regulations.
Act Aug. 1, 1888.

326. "Whenever any person shall trespass upon the grounds belonging to any quarantine reservation, or whenever any person, master, pilot, or owner of a vessel entering any port of the United States, shall so enter * * * in violation of the quarantine regulations, * * * such person trespassing, or such master, pilot, or other person in command of a vessel shall, upon conviction thereof, pay a fine of not more than three hundred dollars, or be sentenced to imprisonment for a period of not more than thirty days, or shall be punished by both fine and imprisonment, at the discretion of the court." * * *

AN ACT granting additional quarantine powers and imposing additional duties upon the Marine-Hospital Service.

Extracts.

[Approved February 15, 1898.]

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That it shall be unlawful for any merchant ship or other vessel from any foreign port or place to enter any port of the United States, except in accordance with the provisions of this act and with such rules and regulations of State and municipal health authorities as may be made in pursuance of, or consistent with, this act; and any such vessel which shall enter, or attempt to enter, a port of the United States in violation thereof shall forfeit to the United States a sum, to be awarded in the discretion of the court, not exceeding five thousand dollars, which shall be a lien upon said vessel, to be recovered by proceedings in the proper district court of the United States. In all such proceedings the United States district attorney for such district shall appear on behalf of the United States; and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

SEC. 2. That any vessel at any foreign port clearing for any port or place in the United States shall be required to obtain from the consul, vice-consul, or other consular officer of the United States at the port of departure, or from the medical officer, where such officer has been detailed by the President for that purpose, a bill of health, in duplicate, in the form prescribed by the Secretary of the Treasury, setting forth the sanitary history and condition of said vessel, and that it has in all respects complied with the rules and regulations in such cases prescribed for securing the best sanitary condition of the said vessel, its cargo, passengers, and crew; and said consular or medical officer is required, before granting such duplicate bill of health, to be satisfied that the matters and things therein stated are true; and for his services in that behalf he shall be entitled to demand and receive such fees as shall by lawful regulation be allowed, to be accounted for as is required in other cases.

The President, in his discretion, is authorized to detail any medical officer of the Government to serve in the office of the consul at any foreign port for the purpose of furnishing information and making the inspection and giving the bills of health hereinbefore mentioned. Any vessel clearing and sailing from any such port without such bill of health, and entering any port of the United States, shall forfeit to the United States not more than five thousand dollars, the amount to be determined by the court, which shall be a lien on the same, to be recovered by proceedings in the proper district court of the United States. In all such proceedings the United States district attorney for such district shall appear on behalf of the United States; and all such proceedings shall be conducted in accordance with the rules and laws governing cases of seizure of vessels for violation of the revenue laws of the United States.

SEC. 5. That the Secretary of the Treasury shall from time to time issue to the consular officers of the United States and to the medical officers serving at any foreign port, and otherwise make publicly known, the rules and regulations made by him, to be used and complied with by vessels in foreign ports, for securing the best sanitary condition of such vessels, their cargoes, passengers, and crew, before their departure for any port in the United

States, and in the course of the voyage; and all such other rules and regulations as shall be observed in the inspection of the same on the arrival thereof at any quarantine station at the port of destination, and for the disinfection and isolation of the same, and the treatment of cargo and persons on board, so as to prevent the introduction of cholera, yellow fever, or other contagious or infectious diseases; and it shall not be lawful for any vessel to enter said port to discharge its cargo, or land its passengers, except upon a certificate of the health officer at such quarantine station certifying that said rules and regulations have in all respects been observed and complied with, as well on his part as on the part of the said vessel and its master, in respect to the same and to its cargo, passengers, and crew; and the master of every such vessel shall produce and deliver to the collector of customs at said port of entry, together with the other papers of the vessel, the said bills of health required to be obtained at the port of departure and the certificate herein required to be obtained from the health officer at the port of entry; and that the bills of health herein prescribed shall be considered as part of the ship's papers, and when duly certified to by the proper consular or other officer of the United States, over his official signature and seal, shall be accepted as evidence of the statements therein contained in any court of the United States.

SEC. 6. That on the arrival of an infected vessel at any port not provided with facilities for treatment of the same, the Secretary of the Treasury may remand said vessel, at its own expense, to the nearest national or other quarantine station, where accommodations and appliances are provided for the necessary disinfection and treatment of the vessel, passengers, and cargo; and after treatment of any infected vessel at a national quarantine station, and after certificate shall have been given by the United States quarantine officer at said station that the vessel, cargo, and passengers are each and all free from infectious disease, or danger of conveying the same, said vessel shall be admitted to entry to any port of the United States named within the certificate. But at any ports where sufficient quarantine provision has been made by State or local authorities the Secretary of the Treasury may direct vessels bound for said ports to undergo quarantine at said State or local station.

SEC. 7. That whenever it shall be shown to the satisfaction of the President that, by reason of the existence of cholera or other infectious or contagious diseases in a foreign country, there is serious danger of the introduction of the same into the United States, and that notwithstanding the quarantine defense this danger is so increased by the introduction of persons or property from such country that a suspension of the right to introduce the same is demanded in the interest of the public health, the President shall have power to prohibit, in whole or in part, the introduction of persons and property from such countries or places as he shall designate, and for such period of time as he may deem necessary.

**QUARANTINE REGULATIONS TO BE OBSERVED AT PORTS AND ON THE FRONTIERS
OF THE UNITED STATES.**

Extracts.

ARTICLE I.—INSPECTIONS.

1. Vessels arriving at ports of the United States under the following conditions shall be inspected by a quarantine officer prior to entry:

- A. Any vessel with sickness on board.
- B. All vessels from foreign ports.
- C. Vessels from domestic ports where cholera or yellow fever prevails, or where small-pox or typhus fever prevails in epidemic form.

Exceptions.—Vessels not carrying passengers on inland waters of the United States. Vessels from the Pacific and Atlantic coasts of British America, provided they do not carry persons or effects of persons nonresident in America for the sixty days next preceding arrival, and provided always that the port of departure be free from quarantinable disease. Vessels from other foreign ports via these excepted ports shall be inspected.

D. Vessels from foreign ports carrying passengers having entered a port of the United States without complete discharge of passengers and cargo. Such vessels shall be subject to a second inspection before entering any other port. Vessels from ports suspected of infection with yellow fever, having entered a port north of the southern boundary of Maryland without disinfection, shall be subjected to a second inspection before entering any port south of said latitude during the quarantine season of such port.

2. The inspections of vessels required by these regulations shall be made by daylight, except in cases of vessels in distress.

3. In making the inspection of a vessel, the bill of health and clinical record of all cases treated during the voyage, crew and passengers' lists and manifests, and, when necessary, the ship's log shall be examined. The crew and passengers shall be mustered and examined and compared with the lists and manifests, and any discrepancies investigated.

4. No person except the quarantine officer, his employees, United States customs officers, or agents of the vessel, shall be permitted to board any vessels subject to quarantine inspection, until after the vessel has been inspected by the quarantine officer and given its discharge.

ARTICLE II.—QUARANTINE.

1. For the purpose of these regulations, the quarantinable diseases are cholera (cholerae), yellow fever, smallpox, typhus fever, and leprosy.

2. Vessels arriving under the following conditions shall be placed in quarantine:

A. With quarantinable disease on board.

B. Having had such on board during the voyage or within thirty days next preceding arrival; or, if arriving in the quarantine season, having had yellow fever on board after March 1, of the current year, unless satisfactorily disinfected thereafter.

C. From ports infected with cholera, or where typhus fever prevails in epidemic form, coming directly or via another foreign port, or via United States ports, unless they have complied with the United States quarantine regulations for foreign ports, also vessels from noninfected ports but bringing persons or cargo from places infected with cholera, yellow fever, or where typhus fever prevails in epidemic form, except as subsequently noted.

D. From ports where yellow fever prevails, unless disinfected in accordance with these regulations, and not less than five days have elapsed since such disinfection.

Exceptions.—The following exceptions may be made to Rules C and D with regard to vessels from ports quarantined against on account of yellow fever.

1. Vessels arriving during certain seasons of the year, to wit: From November 1, to May 1, may be admitted to entry.

2. Vessels bound for ports in the United States north of the southern boundary of Maryland, with good sanitary condition and history, having had no sickness on board at ports of departure enroute or on arrival, provided they have been five days from last infected or suspected port, may be allowed entry at port of destination. But if said vessels carry passengers destined for places south of this latitude the baggage of said passengers shall be disinfected.

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Additional information and changes since the publication of supplement to Part VIII, U.S. Coast Pilot. Corrections in buoy numbers etc., have been made by hand in this volume up to date of issue.

Page 96 (volume).-

Calcasieu Pass.- Jetty buoy No.2, a red nun, is placed in 7 feet of water, just inside of the outer end of the easterly submerged jetty at the entrance to Calcasieu Pass. Calcasieu Lighthouse, N.5/8 W., 1-5/8 miles.

Page 98 (volume).-

Sabine Pass.- In addition to the whistling buoy and bell buoy, eight red nun buoys and one black can buoy are placed to mark the dredged channel between the jetties. The number of buoys Nos. 2 and 4 is changed to 18 and 20 respectively.

Page 22 (supplement).-

Galveston Entrance.- Second Turn gas buoy now shows a fixed red light during periods of 10 seconds, separated by eclipses of 10 seconds.

Page 46 (volume).-

Charlotte Harbor Entrance.- A red nun buoy, No.0, is placed in 17 feet of water to mark an uncharted lump in the entrance to the harbor. From the buoy North Shoal buoy, No.1, bears NW., about 900 feet. The bar is changing.

Page 41 (volume).-

General Directions, Big Marco Pass.- Owing to the shifting of the buoys, to correspond with the changes in the channel over the bar, the directions should read:

Approaching and Entering.- Approaching the entrance keep in 3 fathoms of water until the entrance buoys are sighted. Steer between the entrance buoys, course ENE., leaving red buoy No. 2 on the starboard hand, black buoy No.1 on the port hand, and black buoy No.3 about 20 yards on the port hand. Then steer about NE.3/4 E. for the Channel buoy, which should be left close-to on either hand; from this buoy follow the channel, which is fairly well defined by the shoal on its northern side, until inside the north point of the entrance. Anchor just inside the north point.

Pages 12, 58 (volume).-

Carabelle River Bar Range Beacon lights.- The lights in their present locations are discontinued and new lights are established to mark the new dredged channel into the mouth of the river.

The range line should be followed from a point (the southeasterly end of the new dredged channel) $3/5$ mile southeasterly from the new front light to within about 100 feet of the light, when the course should be changed toward the wharf in the river.

Timber Island Beacon Light is discontinued.

Page 86 (volume).-

Lake Pontchartrain.- Section 2.- Channel buoy, a black and white perpendicularly striped nun, is placed in 7 feet of water, to mark the best water in Lake Pontchartrain from West Rigolets to buoy No. 2. West Rigolets Lighthouse, NE. $1/2$ N.;

Pointe aux Herbes Lighthouse, W. $1/4$ N.

Page 49 (volume).-

Tampa Bay.- North Channel.- Mullet Key Shoal buoy, No. 0, black can, is placed in 27 feet of water. Egmont Key Lighthouse, SW. $1/2$ W., $7/8$ mile.